IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

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| BRIDGESTONE SPORTS CO., LTD., and BRIDGESTONE GOLF, INC., | ) | |
| Plaintiffs, | ) | C.A. No. 05-132 (JJF) |
| v. | ) | REDACTED – PUBLIC VERSION |
| ACUSHNET COMPANY, | ) | |
| Defendant. | ) | |

**BRIDGESTONE'S REPLY IN SUPPORT OF ITS DAUBERT MOTION TO PRECLUDE DR. DAVID FELKER FROM OFFERING TESTIMONY REGARDING INVALIDITY AND NON-INFRINGEMENT OF THE BRIDGESTONE PATENTS**

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Original Filed: May 18, 2007
Redacted Version Filed: May 22, 2007

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Pursuant to Federal Rules of Evidence 702 and 703, Dr. Felker's expert opinion testimony as to the alleged invalidity and non-infringement of the Bridgestone patents should be excluded. Dr. Felker is not a person of at least "ordinary skill in the art" as it relates to the design, development and manufacture of golf balls, much less one of "extraordinary skill in the art," as Acushnet contends. Furthermore, Acushnet's own opposition confirms that his opinions are inherently unreliable because they are based on an incomplete set of test results selected by Acushnet's counsel.

I. Dr. Felker Admits That He Is Neither One of "Ordinary Skill In The Art" Nor One of "Extraordinary Skill In The Art"

Acushnet ignores Dr. Felker's admission that he is not one of "ordinary skill in the art" related to golf balls, by claiming that he is one of "extraordinary skill in the art" (D.I. 500 at 1-3). Not only is this illogical, but it lacks record support.[1]

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1 The cases cited on page two of Acushnet's opposition are not applicable to Dr. Felker's qualifications. These cases merely hold that an expert who has "extraordinary skill in the art" may offer testimony from the perspective of one of "ordinary skill in the art." *Endress & Hauser, Inc. v. Hawk Measurement Sys. Pty Ltd.*, 122 F.3d 1040, 1042 (Fed. Cir. 1997) (refusing to apply "one of ordinary skill in the art" standard to an expert with exceptional skill); *Scholl, Inc. v. S.S. Krege Co.*, 580 F.2d 244, 246 (7th Cir. 1978) (noting that the level of "ordinary skill in the art" was surpassed by an expert with extraordinary skills); *Neutrino Dev. Corp. v. Sonosite, Inc.*, 410 F. Supp. 2d 529, 535-36 (S.D. Tex. 2006) (holding that an expert need not have the same skills as an inventor but must understand the claimed invention as one with "ordinary skill in the art").

Acushnet states that the parties' respective experts agree in general that one of ordinary skill in the art "would have a B.S. in chemistry or an equivalent discipline with five or more years in the golf ball industry, i.e., manufacturing, design and/or development" (D.I. 500 at 2-3.). This is incorrect. Neither expert suggested that five years of general "golf ball industry" experience (D.I. 500 at 2) or five years of aimlessly "working in a golf ball plant" (*id.* at 3) met this standard. Instead, the experts agreed that five or more years of experience specifically in the golf ball manufacturing, design and/or development field would suffice. (Exh. A, Felker Invalidity Report at 3; Exh. B, Calabria Invalidity Report at 7).

Necessarily underlying what the parties did agree on are the following two criteria: (1) the subject matter of the expert's golf ball experience must be golf ball manufacturing, design or development; and (2) that experience must have been for at least five years. Dr. Felker fails to satisfy either criterion; he is not even close. Acushnet says Dr. Felker was at Callaway Golf Ball Company ("Callaway") for four years (actually three years and ten months), but entirely ignores the fact that Dr. Felker was a senior level executive with profit and loss responsibility and other administrative work that is handled by senior management. Acushnet cannot dispute that Dr. Felker did not come close to having five years of real golf ball design, development and manufacturing experience.

Acushnet does not (and cannot) dispute that Dr. Felker lacks the requisite level of experience in the golf ball manufacturing, design and/or development field. Acushnet instead tries to parlay his chemical engineering experience at DuPont into the golf ball arena.[2] Working with "rubber products" at DuPont, however, is not working in the "golf ball manufacturing, design and/or development field."[3] Dr. Felker's former employer, Callaway, acknowledged as much. When Callaway hired Dr.

2 Bridgestone does not contest Dr. Felker's qualifications with respect to his educational background and as an expert in chemistry.

3 Acushnet claims that if Dr. Felker is not qualified to testify, then neither is Dr. Caulfield, one of Bridgestone's experts (D.I. 500 at 3). Acushnet misses the point. Dr. Caulfield is offered as an expert on "material properties and material property testing of golf balls"—not golf ball manufacturing, design and/or development. (Exh. C, Caulfield Supp. Report at 4).

Felker from DuPont, it noted: "in the spirit of beginning with a green field and blank slate. . .[it] didn't take the head of Spalding or the head of Titleist or the head of Wilson or the head of Maxfli" to fill the position. (Exh. D, Golf Digest Article, at 8.). Indeed, Dr. Felker's first day on the job with Callaway was his "first real tour of a golf ball manufacturing operation" (Exh. E, Felker Depo. at 30:17-31:6).

Acushnet similarly fails to address how Dr. Felker's three-year, ten-month term of employment—as a senior level executive with Callaway—amounts to five years of experience in the golf ball manufacturing, design and/or development field. Moreover, it was not even until three years into Dr. Felker's employment there that the Callaway manufacturing facility "started up" (Exh. E, Felker Depo. at 78:9-79:15). Even then, approximately thirty percent of his time was spent on activities other than research and development (*id.* at 71:18-79:15; Exh. F, Exh. 2 to Felker Depo.). It is therefore irrelevant that Dr. Felker was allegedly "involved in every aspect of making golf balls during his tenure at Callaway" (D.I. 500 at 3) Whatever his experience, it did not occur over a five-year period.

Pursuant to Rule 702, the Court should exclude Dr. Felker's testimony on the alleged non-infringement and invalidity of the Bridgestone patents because he is not in a position to offer an opinion from the perspective of one of "ordinary skill in the art," let alone "extraordinary skill in the art."

II. Acushnet's Opposition Brief Acknowledges That Its Counsel Improperly Filtered Test Data

The case law could not be any clearer: expert testimony based upon a filtered set of facts or data of legal counsel's choosing should be excluded because it is inherently unreliable.[4] *Montgomery County v. Microvote Corp.*, 320 F.3d 440, 448 (3d Cir. 2003) (affirming exclusion of testimony where expert admitted that he relied on a sampling of tapes selected by legal counsel); *In re TMI Litig.*, 193 F.3d 613, 697-98 (3d Cir. 1999) (affirming exclusion of testimony where the sole basis for expert's opinion

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4 Acushnet tries to distinguish *Crowley* and its progeny by citing *NN&R, Inc. v. One Beacon Ins. Group.*, No. 03-5011, 2006 WL 2845703 (D.N.J. Sept. 29, 2006). The *NN&R* case, however, only further proves Bridgestone's point. There, the court concluded that an expert's opinion was sufficiently reliable because counsel had not provided him "with a skewed version of the facts." *Id.* at *3. As the court noted, this was in marked contrast to the facts in *Crowley* (and also of the instant case), in which expert testimony is based on a highly filtered version of events. *Id.*

were summaries prepared by a party's attorney); *Crowley v. Chait*, 322 F. Supp. 2d 530, 546 (D.N.J. 2004) (excluding testimony where expert had reviewed deposition excerpts that legal counsel had pre-selected).

Acushnet claims that there is no evidence that its legal counsel filtered test data before providing it to Dr. Felker. Yet, the evidence attached to its own opposition brief confirms that that is exactly what occurred.[5]

Bridgestone pointed out in its Daubert motion that Dr. Felker's invalidity report contained results of numerous prior art tests on the Wilson Ultra Tour Balata ball, but oddly did not contain cover and plaque hardness measurements, because Acushnet's Vice President of Intellectual Property, Jeffrey Dalton, provided that data to counsel for Acushnet (D.I. 451 at 9). In response, Acushnet says that these omissions were explainable because Dr. Felker purportedly had not asked for that data (D.I. 500 at 6). That is incorrect. Dr. Felker did ask for the data, but counsel for Acushnet did not give it to him:

[redacted]

5 It is therefore no surprise that Acushnet alternatively argues that even if its counsel did improperly filter test data, that "go[es] to the weight and credibility of the evidence Dr. Felker relied upon—not to the reliability of the methodology he used or whether it will assist the trier of fact" (D.I. 500 at 1). Acushnet's interpretation of the law is incorrect. Under Federal Rule of Evidence 703, "if the data underlying the expert's opinion are so unreliable that no reasonable expert could base an opinion on them, the opinion resting on that data must be excluded." *In re TMI Litig.*, 193 F.3d at 697.

[redacted]

The only reasonable inference is that Acushnet's counsel impermissibly fed Dr. Felker only those test results that it believes supports its position, but filtered out those that do not.[6] *Montgomery County*, *In re TMI Litig.*, and *Crowley* hold that such selective filtering renders the expert's opinion inherently unreliable, and that exclusion of such opinion testimony is warranted. Acushnet's narrow focus only on the test results that were provided to Dr. Felker thus misses the point. It is the filtering of the test results that taints the reliability of Dr. Felker's opinion.

## CONCLUSION

Bridgestone requests that the Court preclude Acushnet from offering testimony from Dr. Felker as to the asserted invalidity and non-infringement of the Bridgestone's patents.

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6 The same inference applies to the filtered test results regarding the EP '043 reference and the selective data included in the summary charts concerning core formulation attached to the Dalton Declaration, both of which were addressed in Bridgestone's opening motion to exclude Dr. Felker's testimony (D.I. 500 at 8-9).

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May 18, 2007
831618

CERTIFICATE OF SERVICE

I certify that on May 18, 2007 I electronically filed the foregoing with the Clerk of the Court using CM/ECF, which will send notification of such filing(s) to Richard L. Horwitz and David E. Moore.

I further certify that I caused copies to be served upon the following on May 18, 2007 in the manner indicated:

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# EXHIBIT A

UNITED STATES DISTRICT COURT
DISTRICT OF DELAWARE

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| BRIDGESTONE SPORTS CO., LTD., and BRIDGESTONE GOLF, INC.,<br>Plaintiffs,<br>v.<br>ACUSHNET COMPANY,<br>Defendant. | Case No. 05-CA-132 (JJF)<br><br>**INVALIDITY EXPERT REPORT OF DR. DAVID FELKER** |
| ACUSHNET COMPANY,<br>Counterclaimant,<br>v.<br>BRIDGESTONE SPORTS CO., LTD., and BRIDGESTONE GOLF, INC.,<br>Counterdefendant. | |

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## I. INTRODUCTION

I have been retained by the Acushnet Company ("Acushnet") to testify as an expert in this case and to review U.S. Patent Nos. 5,553,852 ("the '852 patent"), 5,743,817 ("the '817 patent"), U.S. Patent No. 5,782,707 (the '707 patent), U.S. Patent No. 5,803,834 (the '834 patent) and U.S. Patent No. 6,6791,791 (the '791 patent) (collectively, the "Bridgestone patents").

I understand that Bridgestone is asserting infringement by Acushnet of claims 1, 6, and 7 of the '852 patent, claim 1 of the '817 patent, claim 1 of the '707 patent, claim 1 of the '834 patent and claims 11, 13, 16 and 26 of the '791 patent.

In this report, I provide my expert opinion regarding whether the asserted claims are valid in light of principles of patent law, as those principles have been explained to me.

## II. QUALIFICATIONS/BACKGROUND

During the past six years, I have served as a golf ball industry consultant and expert witness. I have provided technical advice and expert testimony in golf ball technology-related cases, performed patent analysis and provided technical advice, lead scientific efforts to demonstrate performance differences between golf products and performed and/or directed physical property testing and outdoor performance comparison testing efforts.

Prior to my work as a consultant, I spent four years as Vice President of Research & Development at Callaway Golf Ball Company and spent thirteen years at E.I. Dupont de Nemours in various research and manufacturing technical positions, culminating with two years as Technology Superintendent-Neoprene at duPont Dow Elastomers. I have a M.S. and Ph.D. in Chemical Engineering from Iowa State University, and a B.S. in Chemistry from the University of Wisconsin at Eau Claire. I have eight patents in my name related to golf balls and golf clubs. At Callaway, I lead the development of four golf balls, including the highly successful *Rule 35* and *HX*.

A copy of my *curriculum vitae*, including a list of my publications, is attached as Exhibit 1.[1]

## III. MATERIALS REVIEWED AND CONSIDERED

A list of the materials I reviewed and considered in the preparation of this report can be found at Exhibit 2. I have also relied on my professional and educational experience in the field of golf ball design and manufacture, as outlined above.

## IV. PRINCIPLES OF PATENT LAW

Although I am not a lawyer, I have been informed of some basic legal principles, which I have used to perform the analysis found in this report. I understand that the patent laws provide rules as to what constitutes prior art. For instance, I have been informed that if a printed publication is published, or a U.S. patent is issued, or the invention was publicly used, more than one year before the filing of an application, that reference is prior art. I also have been informed that an issued U.S. patent, filed before the filing date of the application in question, but issued after the filing date of the application in question, is also prior art. I understand that the patent statutes provide for other definitions of prior art. I have been informed that a person is not entitled to a patent if the claimed invention was described in a printed publication, was patented, was publicly used, or was known to others prior to the invention of the claimed subject matter. I understand that a claim is invalid as "anticipated" if a single prior art reference teaches each and every limitation of the claim, either expressly or inherently. I understand that an inherent limitation is one that is necessarily present. I also understand that, even though not anticipated, a claim may still be rendered invalid if the claim was obvious in view of the prior art. In determining whether a claim was obvious, I understand an inquiry into the following factors is proper:

a. The scope and content of the prior art;

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[1] I am being compensated $325/hr for the time spent in preparing this report and $375/hr for testifying.

b. The level of ordinary skill in the art;

c. The differences between the claimed invention and the prior art;

d. Whether the differences are such that the claimed invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made; and

e. Whether secondary considerations exist, such as long-felt but unresolved need, failure of others, commercial success, licensing, copying, etc., and, if so, whether there is a nexus between the secondary consideration and the claimed invention.

I have considered the above criteria in performing my analysis and forming my opinions found in this report. I understand that under U.S. patent laws, issued patents are presumed valid, but that presumption can be rebutted. I further understand that the presumption of validity is more easily overcome where the evidence consists of material prior art not cited by the patentee and not considered by the Examiner during prosecution. I also understand that when reviewing the validity of a claim, the analysis is to be performed from the perspective of one of ordinary skill in the art. In my opinion, one of ordinary skill in the art at the relevant time period for each of the Bridgestone patents I address would have had a B.S. in chemistry or an equivalent discipline with five or more years of experience in the golf ball manufacturing field.

I understand that a U.S. patent application may claim the benefit of an earlier filing date of a foreign application(s). To obtain this benefit, certain rules must be followed, one of which, as I understand it, is that the foreign patent application must contain a written description of the invention, and of the manner and process of making and using the invention, in such full, clear, concise, and exact terms as to enable any person skilled in art to which it pertains to make and to use the full scope of the invention as claimed.

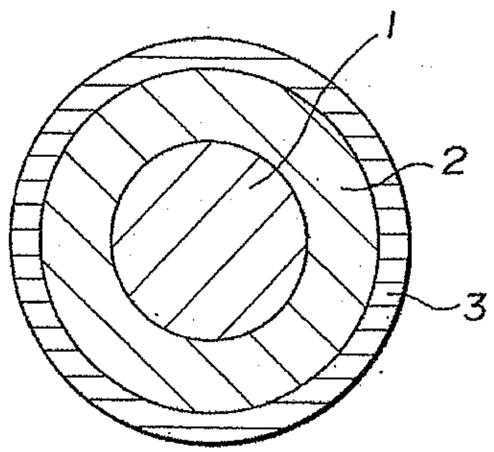
## V. THE '852 PATENT

### A. Disclosure of the '852 Patent

The '852 patent relates to three-piece golf balls comprising a core, and intermediate layer and an outer cover. The center core of the golf ball claimed in the'852 patent has a diameter of at least 29 mm and a specific gravity of less than 1.4. The intermediate layer of the '852 ball has

a thickness of at least 1 mm, a specific gravity of less than 1.2 and a hardness of at least 85 on JIS C scale. The outer cover layer of the '852 ball has a thickness between 1 – 3 mm and is softer than the intermediate layer. The '852 patent states that this combination of features results in a ball that has a good total balance of properties in that feeling and controllability are improved with no sacrifice to flying performance and durability.

I understand that Bridgestone alleges that Acushnet infringes claims 1, 6 and 7 of the '852 patent. Claim 1 of the '852 patent is an independent claim. Claims 6 and 7 are both dependent claims that depend from claim 1. Figure 1 of the '852 patent, reproduced below, shows a multi-piece golf ball of the claimed invention, with a solid core (1), an inner cover (2) and an outer cover (3):




Claim 1 of the '852 patent reads:

> A three-piece solid golf ball comprising:
>
> a center core, an intermediate layer, and a cover enclosing the core through the intermediate layer, said center core having a diameter of at least 29 mm and a specific gravity of less than 1.4, said intermediate layer having a thickness of at least 1 mm, a specific gravity of less than 1.2, and a hardness of at least 85 on JIS C scale, the specific gravity of said intermediate layer being lower than the specific gravity of said center core, and said cover having a thickness of 1 to 3 mm and being softer than said intermediate layer.

Claim 6 of the '852 patent reads:

> The golf ball of claim 1 wherein a difference in the specific gravity between the center core and the intermediate layer is in the range of 0.1 to 0.5.

Claim 7 of the '852 patent reads:

> The golf ball of claim 1 wherein the specific gravity of said intermediate layer is in the range of 0.9 to 1.0.

A copy of the '852 patent is attached to this report as Exhibit 3.

**B. Prosecution History of the '852 Patent**

The '852 patent, entitled "Three-Piece Solid Golf Ball," issued on September 10, 1996, from a patent application filed on July 8, 1994 claiming priority to Japanese Patent Application No. 5-193065, filed July 8, 1993. As originally filed, the application had 4 claims, including the sole independent claim, which read:

> A three-piece solid golf ball comprising a center core, an intermediate layer, and a cover enclosing the core through the intermediate layer,
>
> said center core having a diameter of at least 29 mm and a specific gravity of less than 1.4,
>
> said intermediate layer having a thickness of at least 1 mm, a specific gravity of less than 1.2, and a hardness of at least 85 on JIS C scale, the specific gravity of said intermediate layer being lower than the specific gravity of said center core, and said cover having a thickness of 1 to 3 mm.
>
> (Ex. 4, '852 Prosecution History, at Original Claim 1).

These claims were rejected by the Patent and Trademark Office (PTO) Examiner. (*Id.*, at Office Action mailed May 18, 1995). The Examiner explained:

> Claims 1-4 are rejected under 35 U.S.C. § 102(a) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over Molitor et al., Nakahara et al., Kamada et al., Chikaraishi et al., Kim et al. and Viollaz, each taken alone. As understood, inherent features of the reference [sic] golf balls are claimed. The burden is on applicants to show that inherency is not involved. Any possible distinctions over said references involve the arbitrary substitution of another known material for the balls intermediate layer, and such would be obvious to a person having ordinary skill in the art.
>
> (*Id.* at 3.)

Following the Examiner's rejection, Bridgestone amended claim 1 and added new claims 5-8. Claim 1 was amended to require that the cover be softer than the intermediate layer. (*Id.*, at Amendment under 37 C.F.R. § 1.115 at 2-3.) Bridgestone argued against each of the prior art references individually noting that each failed to teach an intermediate layer that was harder than each of the core and the cover layer, and thus, resulted in inferior feel and flight distance versus golf balls of the Bridgestone application. (*Id.*)

Bridgestone supported its position through the declaration of Mr. Yamagishi, one of the inventors of the '852 patent. The declaration quoted a number of passages from the specification describing how the golf balls of the invention were made and described how subjective characteristics (e.g., "feel") were improved. (*Id.*, at Yamagishi Declaration). Following these arguments and the submission of this declaration, the Examiner allowed the claims. (*Id.*, at Notice of Allowability Dec. 26, 1995.)

### C. Opinion Regarding the Validity of Claims 1, 6, and 7 of the '852 Patent

As set forth in detail below, I have analyzed the '852 patent and based on the perspective of one of ordinary skill in the art. In my opinion, claims 1, 6 and 7 of the '852 patent are anticipated and/or rendered obvious by the prior art.

#### 1. The Asserted Claims of the '852 Patent Are Anticipated

##### a. U.S. Patent No. 4,431,193 to Nesbitt Anticipates Claim 1

U.S. Patent No. 4,431,193 to Nesbitt ("Nesbitt '193") (Ex. 5) issued February 14, 1984, based on an application filed August 25, 1981. As Nesbitt '193 issued as a patent a decade before the earliest priority date of the '852 patent (July 8, 1993), I understand that Nesbitt '193 is prior art.

Nesbitt '193 discloses a multi-piece solid golf ball, which has a solid core, an intermediate layer and an outer cover layer. (Ex. 5, Nesbitt '193 at col. 2, lines 30-50). Figure 1

of the Nesbitt '193 patent, reproduced below, shows a multi-piece golf ball (10), with a solid core (12), an intermediate layer (14) and an outer cover (16):

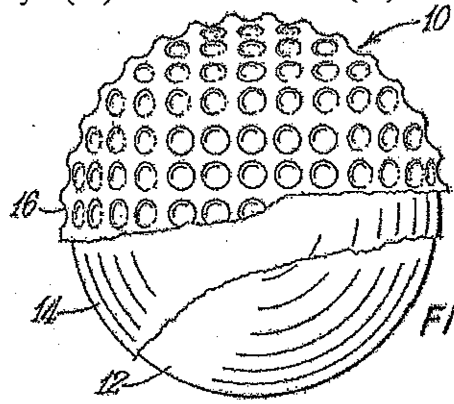



FIG. 1

Figure 2 of the Nesbitt '193 patent, reproduced below, describes the intermediate layer (14) as a hard resinous material (Type 1605 Surlyn) with a thickness in a range of 0.020 to 0.070 inches and the outer cover (16) as a comparatively softer resinous material (Type 1855 Surlyn) with a thickness in a range of 0.020 to 0.100 inches:

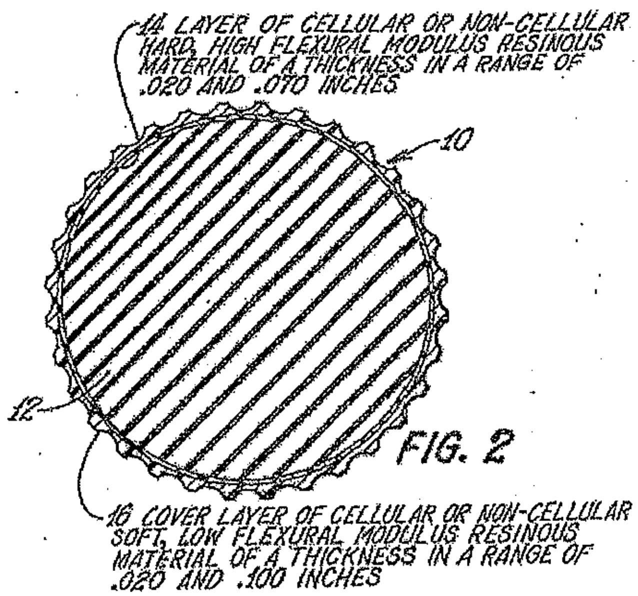



FIG. 2

Nesbitt '193 discloses that the intermediate layer is of a thickness in a range of 0.020 inches and 0.070 inches and may be "Type 1605 Surlyn" marketed by E. I. du Pont de Nemours

and Company ("du Pont"). (Ex. 5, Nesbitt '193, at Abstract; col. 3, lines 16-22). Nesbitt '193 further discloses that the outer cover is of a thickness of 0.020 inches and 0.100 inches and may be Type 1855 Surlyn," also marketed by du Pont. (Ex. 5, Nesbitt '193, at Abstract; col. 3, lines 22-25). Nesbit '193 also incorporates by reference the IML layer and cover materials in U.S. Patent No. 4,272,637 to Molitor ("Molitor '637") (Ex. 5, Nesbitt '193, col. 3, lines 51-60).

Surlyn is a du Pont trademark for an ionomer resin. An ionomer resin is a thermoplastic polymer that is "ionically crosslinked." Surlyn resins are derived from ethylene / methacrylic acid copolymers. du Pont manufactures several grades of Surlyn resins, including the Surlyn 1605 and Surlyn 1855, described in the Nesbitt '193 patent. There are several applications for Surlyn ionomer resins, including golf ball covers, automotive rub strip, athletic shoe soles, lacrosse sticks, toys, cosmetic packaging, wire and cable insulation, and ski boots.

I have reviewed the Nesbitt '193 patent in light of claim 1. It is my opinion that Nesbitt '193 discloses each and every limitation of claim 1, and therefore anticipates claim 1.

**(1) The Layer Thicknesses of the Nesbitt '193 Ball Meets the Requirements of Claim 1 of the '852 Patent**

The Nesbitt '193 discloses a golf ball having a total diameter of at least 1.680 inches, which is the minimum diameter prescribed by the United States Golf Association Rules. (Ex. 5, Nesbitt '193 at col. 2, lines 50-58; col. 3, line 12.) One inch is equal to 25.4 millimeters. Therefore, 1.680 inches equates to 42.67 millimeters.

The Nesbitt '193 patent discloses that the outer cover has a thickness of 0.020 inches to 0.100 inches. (Ex. 5, Nesbitt '193 at col. 3, lines 22-25.) This equates to 0.508 mm to 2.54 mm. The Nesbitt '193 patent discloses that the intermediate layer may have a thickness of 0.020 inches to 0.070 inches. (Ex. 5, Nesbitt '193 at col. 3, lines 19-22.) This equates to 0.508 mm to 1.778 mm. Subtracting the thickness of the intermediate layer and outer cover from the diameter of the ball, and converting to millimeters, I determined that the diameter of the core disclosed in Nesbitt '193 ranges from 34.04 mm to 40.64 mm. In summary:

| Layer | '852 Thickness Claim Requirements | Thickness of Layers Nesbitt '193 Prior Art |
|---|---|---|
| Outer Cover | Between 1 – 3 mm | 0.508 mm - 2.54 mm |
| Intermediate Layer | At least 1 mm | 0.508 mm – 1.778 mm |
| Core (diameter) | At least 29 mm | 34.04 mm to 40.64 mm |

**(2) The Specific Gravity of the Nesbitt '193 Ball Meets the Requirements of Claim 1 of the '852 Patent**

The material forming the intermediate layer of the golf ball disclosed in the Nesbitt '193 patent is Surlyn 1605. (Ex. 5, Nesbitt '193 at col. 3, lines 19-22.) According to the product brochure by du Pont, the specific gravity for Surlyn 1605 is 0.95. (Ex. 6). Thus, the intermediate layer of the Nesbitt golf ball has a specific gravity within the range of the golf ball disclosed in claims of '852 patent.

Similarly, one material forming the outer cover layer of the golf ball disclosed in the Nesbitt '193 patent is Surlyn 1855. (Ex. 5, Nesbitt '193 at col. 3, lines 22-25.) According to the product brochure by du Pont, the specific gravity for Surlyn 1855 is 0.96. (Ex. 6).[2]

The Nesbitt '193 patent does not explicitly state the specific gravity of the center core. However, the specific gravity of the Nesbitt '193 core can be easily calculated from its volume, weight and density (values that can be determined from the Nesbitt' 193 patent) by performing a few simple calculations, as detailed below.

**(3) Volume of the Nesbitt '193 Ball**

The volume of a spherical object may be determined if you know its diameter, using an equation from geometry:

$$\textit{Volume of the sphere} = 4/3\ \pi\ (\textit{diameter of the sphere} / 2)^3$$

[2] The Nesbitt '193 patent discloses that the intermediate layer and the outer cover layer can be formed by molding the Surlyn material into a spherical shape. (Ex. 5, Nesbitt '193 at col. 3, lines 26-29 and 33-38.) It is my understanding and it has been my experience that injection molding is a well-known method of making solid golf balls and that this method does not significantly affect the specific gravity or hardness of raw Surlyn materials.

Applying this equation, I calculated that a golf ball with a diameter of 1.680 inches (4.267 cm) has a total volume of 40.68 $cm^3$.

I also calculated that the Nesbitt '193 core, which has a diameter between 34.04 mm to 40.64 mm, would have a core volume from 20.64 $cm^3$ to 35.14 $cm^3$.

The Nesbitt '193 intermediate layer, which has a diameter of 0.508 mm to 1.778 mm, would have an intermediate layer volume that ranged from 2.19 $cm^3$ to 8.89 $cm^3$ for a golf ball with a diameter of 1.680 inches.

The Nesbitt '193 outer cover layer, which has a diameter of 0.508 mm to 2.54 mm, would have an outer cover layer volume from 2.84 $cm^3$ to 12.87 $cm^3$ for a golf ball with a diameter of 1.680 inches. In summary:

| **Nesbit '193 Layer** | **Calculated Volume ($cm^3$)** |
|---|---|
| Outer Cover Layer | 2.84 – 12.87 |
| Intermediate Layer | 2.19 – 8.89 |
| Core | 20.64 – 35.14 |

**(4) Weight of the Nesbitt '193 Ball**

Nesbitt '193 states that the weight of the total ball is 1.620 ounces. This is the maximum prescribed weight allowed by The United States Golf Association Rules. (Ex. 5, Nesbitt '193, at col. 2, lines 50-58). Because the total weight of the ball is known, the weight of the core of a three-piece solid golf ball can be determined by subtracting the weight of the intermediate layer and the weight of the outer cover from the total weight of the ball. The weight of the intermediate layer and the weight of the outer cover of the Nesbitt '193 golf ball can be calculated from their volume using their known density.

The density of an object is the weight of the object divided by the volume of the object. Therefore, the weight of an object equals its volume multiplied by its density.

Specific gravity is the ratio of the density of any substance to the density of water. The density of water is 1.0 g/cm$^3$ at 20°C. Thus, the density of an object measured in units of g/cm$^3$, is equal to its specific gravity. Surlyn 1605, which has a specific gravity of 0.95, has a density of 0.95 g/cm$^3$. Surlyn 1855, which has a specific gravity of 0.96, has a density of 0.96 g/cm$^3$.

Using the density and the volume ranges calculated above, I determined the weight of the outer cover layer of the Nesbitt '193 golf ball ranges from 2.72 grams to 12.35 grams, for a golf ball weighing 1.620 ounces (45.93 grams).

Using the density and the volume ranges calculated above, I determined the weight of the intermediate layer of the Nesbitt '193 golf ball ranges from 2.09 grams to 8.44 grams, for a golf ball weighing 1.620 ounces (45.93 grams).

The total weight of the Nesbitt '193 ball is 1.620 ounces. (Ex. 5, Nesbitt '193 at col. 3, lines 19-25.) Subtracting the weight of the outer cover and the weight of the intermediate layer from the overall weight of the ball, I determined the weight of the core in the Nesbitt '193 ball ranges from 26.76 grams to 40.64 grams. In summary:

| Nesbitt '193 Layer | Calculated Weight (grams) |
|---|---|
| Outer Layer | 2.72 – 12.35 |
| Intermediate Layer | 2.09 – 8.44 |
| Core | 26.76 – 40.64 |

The density of the core is the core weight divided by the core volume. Using the values calculated above for the core weight and core volume, I determined the density of the Nesbitt core ranges from 1.156 g/cm$^3$ to 1.296 g/cm$^3$. Therefore, the specific gravity of the core of the Nesbitt '193 patent ball ranges from 1.156 to 1.296. In summary:

| Nesbitt '193 Layer | Specific Gravity ($g/cm^3$) |
|---|---|
| Outer Layer | 0.96 |
| Intermediate Layer | 0.95 |
| Core | 1.156 – 1.296 |

**(5) Specific Gravity of the Nesbitt '193 Ball with Dimples**

I then analyzed what affect, if any, the presence of dimples on the golf ball would have on the specific gravity of the Nesbitt '193 ball. I found that even in the most extreme case, where the dimples occupy 100% of the volume of the cover and thus the weight of the cover would be 0 grams in this theoretical instance, the Nesbitt '193 patent still discloses a golf ball having a core specific gravity of less than 1.4. Specifically, I re-calculated the specific gravity of the core of a "dimpled" ball, using values disclosed by the Nesbitt '193 patent that are also within the ranges claimed in the '852 patent. I selected an outside cover layer thickness of 1.0 mm (0.394 inches) and an intermediate layer thickness of 1.0 mm. These are the minimum values claimed in the '852 patent.

I then calculated the specific gravity of the core of this ball assuming that the entire volume of the cover layer of this ball was occupied by dimples, and thus the cover had a weight of 0 grams. The specific gravity of the core of such a ball would be 1.361. (See Exhibit 7 for a detailed explanation of this calculation).

Because the dimple volume can never exceed the volume of the cover, it can be said with certainty that the Nesbitt '193 patent discloses a golf ball having the physical dimensions of the '852 patent and core specific gravity of less than 1.4 for any dimple volume.

### (6) The Hardness of the Nesbitt '193 Ball is Within the Claims of the '852 Patent

The Nesbitt patent expressly discloses that the intermediate layer is made of Surlyn 1605, and the outer cover is made of Surlyn 1855. The Shore-D hardness for Surlyn 1605 is 67. (Ex. 6). The Shore-D hardness for Surlyn 1855 is 56. (Ex. 6). Published references from du Pont disclose the relationship between Shore D hardness and JIS-C hardness as follows: Shore D = 0.76 * JISC – 8. (Ex. 8)

Substituting the disclosed Shore D values for Surlyn 1605 (intermediate layer) and 1855 (outer cover) and solving for JIS-C hardness, I calculate that the JIS-C hardness of Surlyn 1605 is 99, and the JIS-C hardness of Surlyn 1855 is 84. The intermediate layer of the Nesbitt '193 ball is at least 85 on the JIS-C scale and is harder than the outer cover layer.

### (7) Unfoamed and Foamed Layers

Golf ball layers can either be foamed or unfoamed. Foamed layers can be formed from natural or synthetic polymeric materials by injecting a gas into the materials. (*See* Ex. 9, U.S. Patent 4,274,637 to Molitor). Foaming is used to alter or regulate the coefficient of restitution. The coefficient of restitution of a golf ball is generally indicative of the resiliency of the ball, and hence indicative of how far the ball will travel when struck. Typically, a foamed layer is somewhat lighter, less dense and softer than an unfoamed layer.

The Nesbitt '193 patent discloses using both foamed and unfoamed layers. The Nesbitt '193 ball, therefore, can be made using either foamed or unfoamed cover layers. (Ex. 5, Nesbitt '193, at col. 3, lines 51-54: "either of the layers may be cellular when formed of a foamed natural or synthetic polymeric material."; col. 4, lines 1-2: "The inner, intermediate or first layer 14 may be unfoamed or noncellular . . . . the outer or cover layer or ply 16 may be of unfoamed or noncellular material."; col. 3, lines 65-68: "The outer or cover layer or second layer 16 may

be foamed to a greater degree than the inner, intermediate, or first layer 14 as the material of the layer 16 is comparatively soft.")[3]

It is my understanding that so long as one embodiment of a prior art reference discloses all of the elements of a claim, the claim is invalid, regardless of whether other embodiments of the prior art reference do not. As shown above, an unfoamed golf ball made according to the Nesbit '193 patent with a 1.0 mm thick Surlyn 1605 intermediate layer and a 1.0 mm thick Surlyn 1855 outer cover, would anticipate the '852 patent.

There are many different golf balls with a foamed cover layer or a foamed intermediate layer or with both a foamed cover layer and intermediate layer that can be made according to the Nesbit '193 patent, that are also within the ranges claimed in the '852 patent. For example, the three foamed golf ball examples given in the table below all anticipate the asserted claims of the '852 patent. Examples 1-3 have a golf ball weight of 1.62 ounces, a golf ball diameter of 1.68 inches, a cover thickness of 1.0 mm and an intermediate layer thickness of 1.0 mm.

| Example | %foaming of cover layer | cover layer specific gravity | % foaming of Intermediate layer | intermediate layer specific gravity | Case 1: specific gravity of core with 100% dimpled cover layer | Case 2: specific gravity of core with no dimples in the cover layer |
|---|---|---|---|---|---|---|
| 1 | 0% | 0.960 | 5.20% | 0.901 | **1.370** | **1.197** |
| 2 | 100% | 0.000 | 0.00% | 0.950 | **1.361** | **1.361** |
| 3 | 100% | 0.000 | 5.20% | 0.901 | **1.370** | **1.370** |

The core density values for Examples 1-3 above were calculated and reported for two cases: 1) using a cover layer with no dimples and 2) using a cover layer that is composed of 100% dimples. (*See* Ex. 11).

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[3] I further understand that Bridgestone has described the Nesbitt '193 patent as disclosing both foamed and unfoamed layers in one of its own patents. (*See* Ex. 10, Bridgestone Patent No. 4,919,434 at col. 2, line 65 – col.3, line 2: "The outer layer [of the Nesbitt '193 patent] is made of a . . . solid resin or foamed resin."

The three examples above were chosen because they represent the upper levels of foaming that could be used to produce golf balls that are still within the asserted claims of the '852 patent. Example 1 has only a foamed intermediate layer; 5.2% foamed. Example 2 has only a foamed cover layer; 100% foamed. Example 3 has both a foamed cover and intermediate layer foamed; 5.2% foamed intermediate layer and 100% foamed cover layer. All three of the examples above have core specific gravity values less than 1.4, regardless of the level of dimples in the cover, and all of these examples anticipate the asserted claims of the '852 patent. Examples 1-3 represent just a few examples of the many golf balls with foamed layers that can be made according to the Nesbit '193 patent, where the core specific gravity remains below 1.4, and anticipate all the other claims of the '852 patent.

**b. U.S. Patent No. 4,431,193 to Nesbitt Anticipates Claims 6 and 7**

Nesbitt '193 discloses each and every limitation of claims 6 and 7, and therefore anticipates claims 6 and 7 of the '852 Patent. Claim 6 of the '852 patent relates to the golf ball of claim 1, and further specifies that the difference in specific gravity between the center core and the intermediate layer is in the range of 0.1 to 0.5. (Ex. 3, '852 patent, claim 6).

The Nesbitt '193 patent discloses the intermediate layer is made of Surlyn 1605, which has a specific gravity of 0.95. The specific gravity of the Nesbitt '193 core was calculated above to range from 1.156 to 1.296. Therefore, the difference between the specific gravity of the center core and the specific gravity of the intermediate layer of the golf ball disclosed in the Nesbitt '193 patent ranges from 0.21 to 0.35.

Claim 7 of the '852 patent relates to the golf ball of claim 1, discussed above, wherein the specific gravity of the intermediate layer is in the range of 0.9 to 1.0. (Ex. 3, '852 patent, claim 7). The Nesbitt '193 patent discloses the intermediate layer is made of Surlyn 1605, which has a specific gravity of 0.95. (Ex. 6). Thus, Nesbitt `193 patent discloses, expressly or inherently, each and every limitation of claims 1, 6 and 7 of the '852 patent.

### D. Opinion Regarding Invalidity of Claims 1, 6 and 7 of the '852 Patent as Obvious

I understand that even if a claim is not anticipated by the prior art, the claim may still be rendered invalid if it is obvious in light of the prior art. When determining obviousness, more than one reference may be combined to invalidate the claim in question. When combining references, I understand that a motivation to combine the references must exist in the references themselves, or in light of the experience of one of ordinary skill in the art.

Further, when determining obviousness of a claim, I understand that secondary considerations also must be considered. I understand that the secondary considerations that have been raised by Bridgestone in this case include commercial success, licensing, copying, prior attempts and failures and obtaining unexpectedly better performance results.

#### 1. Combination of Prior Art References

Claims 1, 6 and 7 of the '852 patent are obvious in light of the combination of any of: (a) the Nesbitt '193 patent; (b) U.S. Patent No. 5,314,187 ("Proudfit '187"); (c) the Wilson Ultra Tour Balata 90 Golf Ball ("UTB 90"), manufactured by Wilson Sporting Goods; (d) the Wilson Ultra Tour Balata 100 Golf Ball ("UTB 100"), manufactured by Wilson Sporting Goods; and/or the knowledge of those of ordinary skill in the art.

##### a. Nesbitt '193

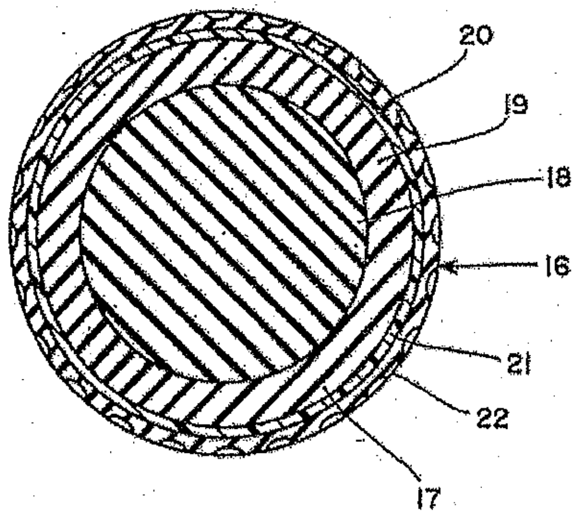
The Nesbitt '193 patent is discussed fully earlier in this report. To the extent that any element of Nesbitt '193 is not found to be inherent from the disclosures in that patent, the '852 patent is still obvious. A person of ordinary skill in the art, possessed with the understandings and knowledge reflected in the prior art, and motivated by the general problem facing the inventors (*i.e.*, improving feel and flight distance), would have been led to make the combination recited in the asserted claims of the '852 patent.

**b. Proudfit '187**

U.S. Patent No. 5,314,187 to Proudfit ("Proudfit '187") (Ex. 12) issued May 24, 1994, based on an application filed June 29, 1992. As Proudfit '187 issued as a patent more than one year before the '852 patent application was filed, I understand that Proudfit '187 is prior art. A copy of the Proudfit '187 prior art reference is attached to this report as Exhibit 12. I have reviewed the Proudfit '187 patent in light of claims 1, 6 and 7 of the '852 patent.

Proudfit '187 describes a multi-piece solid golf ball, with a solid core, an inner cover and an outer cover layer. (Ex. 12, Proudfit '187, at Abstract). The inner cover is molded over the core and the outer cover is molded over the inner cover. (Ex. 12, Proudfit '187, col. 5, lines 44-46). The inner cover is formed from a relatively hard, cut-resistant material such as ionomer resin, and the outer cover or layer is formed from relatively soft material such as natural and synthetic balata. (Ex. 12, Proudfit '187, col. 5, lines 46-51). The Proudfit '187 patent provides a golf ball which has many of the desirable features of balata covered balls ("click" and "feel") but is more durable, more cut-resistant, and easier and less expensive to manufacture. (Ex. 12, Proudfit '187, col. 5, lines 8-12). Figure 2 of the Proudfit '187 patent, reproduced below, shows a multi-piece golf ball of its invention, with a solid core (18), an inner cover (21) and an outer cover (22):

Fig. 2




The Proudfit '187 discloses a golf ball having a core diameter of 1.000 to 1.500 inches. (Ex. 12, Proudfit '187, at col. 7, line 35-37.) This equates to 25.4 mm to 38.1 mm. The Proudfit '187 discloses a golf ball having an inner cover diameter of 0.0250 to 0.2875 inches. (Ex. 12, Proudfit '187, at col. 7, lines 37-39.) This equates to 0.635 mm to 7.302 mm. The Proudfit '187 discloses a golf ball having an outer cover thickness of 0.0450 to 0.0650 inches. (Ex. 12, Proudfit '187, at col. 7, lines 40-42). This equates to 1.143 mm to 1.651 mm. In summary:

| **Layer** | **'852 Thickness Claim Requirements** | **Thickness of Layers Proudfit '187 Prior Art** |
|---|---|---|
| Outer Cover | Between 1 – 3 mm | 1.143 mm to 1.651 mm |
| Inner Cover | At least 1 mm | 0.635 mm to 7.302 mm |
| Core | At least 29 mm | 25.4 mm to 38.1 mm |

The Proudfit '187 ball includes an inner layer formed from a relatively hard, cut-resistant material and an outer layer of soft material such as balata or a blend of balata and other elastomers. (Ex. 12, Proudfit '187, at col. 5, lines 13-17).

**c. Wilson Ultra Tour Balata 90**

The Wilson Ultra Tour Balata 90 golf balls were on sale and in use in the United States as of at least March of 1993[4]. Therefore, I understand that the UTB 90 golf balls are prior art to the '852 patent.

The UTB 90 golf balls appear to be the commercial embodiments of the Proudfit '187 patent, discussed above. My understanding is based on the similarities between the disclosures of the '187 patent and the properties of the UTB 90 balls we tested, 2) the fact that Wilson is the assignee of patent '187, 3) the fact that the '187 patent was filed less than 1 year before the commercial introduction of the UTB 90 golf ball to the disclosures, and 4) the "New 3 Piece Process" given in Proudfit '187 (Ex. 12, Proudfit '187, col. 10, Table 10) corresponds to my understanding of how the UTB 90 would be made.

Following my direction, engineers measured the specific gravity of the core and intermediate layer of the prior art UTB 90 golf ball. (Ex. 13). The tests were performed in accordance with a protocol that I designed, and I have personally inspected the equipment used to perform them. The specific gravity of the core of the UTB 90 ball is 1.132, which is less than 1.4 as required by claim 1 of the '852 patent. The specific gravity of the intermediate layer of the UTB 90 ball is 0.963, which is less than 1.2 and is also less than the specific gravity of the core, as required by claim 1 of the '852 patent.

The specific gravity of the intermediate layer of the UTB 90 ball (0.963) further meets the limitation of claim 7, which requires the specific gravity of the intermediate layer to be in the range of 0.9 to 1.0. The difference between the specific gravity of the center core and the intermediate layer is 0.169, which is between 0.1 to 0.5 as required by claim 6 of the '852 patent.

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[4] Per Jeff Dalton at Acushnet, there is an entry in Acushnet's Competitive Ball Database that shows a sample of these balls was logged in on 3/5/93 (log # 93007).

At my direction, the hardness of the intermediate layer of the prior art UTB golf ball was measured and found to range between 86.6 to 89.7 on the JIS C scale, which is greater than 85 as required by claim 1 of the '852 patent. (Ex. 13).

At my direction, the thicknesses of the outer cover and intermediate layer of the UTB 90 prior art golf ball were measured. The thickness of the outer cover ranged from 1.27 mm to 1.35 mm, which is within the claimed range of 1 -3 mm, as required by claim 1 of the '852 patent. (Ex. 13).

The thickness of the intermediate layer ranged from 0.66 mm to 0.76 mm. (Ex. 13). Claim 1 of the '852 patent requires that the intermediate layer have a thickness of at least 1 mm. Although the testing of the Wilson UTB 90 prior art balls show an intermediate layer less than 1.0 mm, the patent covering the UTB 90 ball, the Proudfit '187 patent, discloses that the intermediate layer can range up to 7 mm.

Thus, the construction of the Wilson UTB 90 golf ball that includes the variation disclosed in the Proudfit '187 patent to the intermediate layer thickness, such that the intermediate layer thickness is greater that 1 mm, would possess all of the claimed limitations of the asserted claims of the '852 patent. It is my opinion, therefore, that claims 1, 6 and 7 of the '852 patent are made obvious by combining the disclosures of the Proudfit '187 patent, discussed above, with the inherent characteristics of its commercial embodiment (i.e., the UTB 90 golf ball) and/or the knowledge of one of ordinary skill in the art at the time of the '852 invention.

### 2. Motivation to Combine Prior Art References

Each of claim 1, 6 and 7 of the '852 patent is obvious by the combination of two or more of (a) the Nesbitt '193 patent; (b) U.S. Patent No. 5,314,187 ("Proudfit '187"); (c) the Wilson Ultra Tour Balata 90 Golf Ball ("UTB 90"), manufactured by Wilson Sporting Goods; (d) the Wilson Ultra Tour Balata 100 Golf Ball ("UTB 100"), manufactured by Wilson Sporting Goods; and/or (e) the knowledge of those of ordinary skill in the art.

Each reference is generally directed to the same problem of improving the "feel" and "durability" of golf balls without sacrificing flying performance. Further, each reference is generally directed to a multi-piece golf ball with prescribed materials and thicknesses for the core, the intermediate or inner cover layer and the outer cover.

With respect to the Nesbitt '193 patent, motivation to combine is provided by the prior art reference itself, the knowledge of one of ordinary skill in the art and what the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. The Nesbitt '193 reference is directed to improving the "feel" of a golf ball without sacrificing the flying performance. (Ex. 5, Nesbitt '193, col. 1, line 65 – col. 2, line 9: "The three-piece golf ball of the invention provides a golf ball in which … the playing characteristics or 'feel' associated with a balata covered ball [are] secured … without sacrificing any advantages of a golf ball having a standard Surlyn cover of the prior art ball…").

The Nesbitt '193 obtains this goal through an improved method of making a three-piece golf ball with prescribed materials and thicknesses for the solid core, the inner cover layer and the outer cover layer, (Ex. 5, Nesbitt '193, col. Abstract; col. 1, line 35 – col. 2, line 9; col. 3, lines 16-25), in which, the inner cover is made of a hard resinous material, such as Surlyn 1605, while the outer cover is made of a comparably softer resin, such as Surlyn 1855. (Ex. 5, Nesbitt '193, col. 3, lines 16-25).

One skilled in the art can derive the specific gravity and exact hardness properties of the disclosed materials in the Nesbitt '193 patent by using basic geometry and looking up established scientific properties of the materials. These tasks were easily within the skill of one in the art at the time of the '852 invention. Therefore, combining the Nesbitt '193 patent with the knowledge of those of ordinary skill in the art makes the claims of the '852 patent obvious.

With respect to combining the Proudfit '187 and UTB 90/100 golf balls, the motivation to combine is similarly provided by the references themselves, the knowledge of one of ordinary skill in the art and what the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. The Proudfit '187 patent, discussed above, describes a golf

ball with an improved cover with prescribed thicknesses for the solid core, the inner layer and the outer cover layer, (Ex. 12, Proudfit '187, col. 7, lines 35-46), to result in a golf ball with improved durability. (Ex. 12, Proudfit '187, col. 5, lines 8-11: "The invention provides a golf ball which has many of the desirable features of balata covered balls but is more durable, more cut-resistant, and easier and less expensive to manufacture than conventional balata covered balls.")

The UTB 90/100 ball is the commercial embodiment of the Proudfit '187 patent, and therefore, is solving the same problems as the invention disclosed in the Proudfit '187 patent. Therefore, one of ordinary skill in the art would immediately be motivated to combine the characteristics of the UTB ball with the Proudfit '187 patent.

## VI. U.S. PATENT NO. 5,743,817

### A. The Disclosure of the '817 Patent

The '817 patent issued to Hisashi Yamagishi, Yoshinori Egashira, and Hideo Watanabe on April 28, 1998. The inventors intended to invent a two-piece golf ball that provided the good flight control of a wound golf ball while maintaining the distance benefit of solid core golf balls. (Ex. 15, Watanabe 8/24/06 Dep. at 55:16-57:3; 58:13-59:19). They sought to provide those advantages by controlling the thickness and hardness of the cover and finding an "optimal balance" between the distortion of the core and the distortion of the ball. (Ex. 15, Watanabe 8/24/06 Dep. at 63:20-64:15; 66:6-11).

The '817 patent pertains to golf balls that allegedly exhibit improved feel, spin properties and iron control "without detracting from the trajectory and flying distance inherent to the solid golf ball." (Ex. 16, '817 patent at col. 1, lines 28-33). The purpose was to combine control – a performance benefit of traditional wound golf balls – with the increased distance off the tee that is generally attributable to solid core golf balls. (Ex. 17, Egashira 9/29/06 Dep. at 81:10-82:6).

The patent covers solid golf balls having a core and a cover enclosing the core. (Ex. 16, '817 patent at col. 1, lines 34-36). Claim 1, the only asserted claim, reads:

> A golf ball comprising a core and a cover wherein said core and said ball has a core hardness and a ball hardness respectively, wherein said core has a distortion of 2.9 to 4.0 mm under a load of 100 kg, the ratio of a core distortion under a load of 100 kg divided by a ball distortion under a load of 100 kg ranges from 1.0 to 1.3, and said cover consists of an ionomer resin as a resin component and has a thickness of 1.3 to 1.8 mm and a Shore D hardness of up to 60.

(Ex. 16, '817 patent at col. 6, lines 48-56).

### B. The Japanese Priority Documents

Bridgestone filed the United States application on September 29, 1995, claiming priority to two Japanese applications – one filed on October 14, 1994 and the second filed on December 14, 1994.

In the October 1994 Japanese application, the inventors initially claimed (1) a core distortion of at least 2.2 mm under a 100 kg load, (2) a range of core distortion divided by ball distortion of 1.0-1.3, and (3) a cover thickness of 1.3-2.4 mm. (See Ex. 18, BSP 242814-242830). As early as March 14, 1994, however, Bridgestone manufactured and sold the Precept EV Extra Spin golf ball in the United States. (*See* Ex. 19, AB 4601-4602). The Precept EV Extra Spin met every limitation of the October 1994 application – it (1) had a core distortion of 2.9, (2) a ball distortion of 2.79, providing a ratio of core distortion divided by ball distortion of 1.1, and (3) a cover thickness of 2.0 mm. (*See* Ex. 20, BSP 89622-26; Ex. 21, Watanabe 8/25/06 Dep. at 166:16-175:22). Thus, the Precept EV Extra Spin golf ball would have anticipated claim 1 of the '817 patent as it was originally drafted in the October 1994 Japanese application.

In the revised Japanese application filed in December 1994, the inventors reduced their claimed cover thickness range to 1.3-1.8 mm. (Ex. 22, Appl. No. 6-333024 at 1). As that was the only change between the two applications, the inventors conceivably reduced the claimed cover thickness in order to preclude anticipation by the prior art Precept EV Extra Spin golf ball. When filed in the United States, the '817 patent application claimed the narrower range of cover thickness from the December 1994 application.

### C. The Prosecution History

The application that matured into the '817 patent was filed in the United States Patent and Trademark Office on September 29, 1995. The patent examiner initially rejected all three claims as anticipated and/or obvious over a number of references, including Bridgestone's own British patent application GB 2 276 628 ("GB '628"). (Ex. 23, Sep. 3, 1996 Office Action at 3-4). In doing so, the examiner stated

> As understood, only inherent features of the reference golf balls are claimed. Any possible distinctions over said golf balls are deemed obvious arbitrary variants thereof, simply to provide comparative examples.

(*Id.* at 3). The examiner specifically addressed the claimed ratio of core distortion by ball distortion (initially claimed as core ***hardness*** divided by ball ***hardness*** – in the context of the core and ball measurements of the '817 patent, "hardness" and "distortion" are synonymous terms that refer to the deformation of the core and/or ball under a 100 kg load). The examiner stated that "since no prior art publication has heretofore disclosed a hardness ratio of the core hardness divided by ball hardness, the invention cannot be properly searched." (*Id.* at 2).

In response to the examiner's rejection, Bridgestone amended its application. Among other things, it changed the core distortion requirement from "at least 2.2 mm" to "a distortion of 2.9 to 4.0 mm," added the requirements that the cover (1) "consist of an ionomer resin as a resin component" and have (2) "a Shore D hardness of up to 60." (Ex. 23, March 4, 1997 Amendment at 1).

In addition, Bridgestone distinguished the '817 patent application from GB '628. In its argument to the patent examiner, Bridgestone stated that the British reference

> fails to disclose the combination of the cover thickness and the core distortion of the present golf ball. The cover thickness of [GB '628] is 2.0 mm and the core distortion is 2.51 to 2.71 (see Examples) which do not fall within the presently claimed range.
>
> Furthermore, as the core distortion increases the core becomes softer. The present core distortion of 2.9 to 4.0 mm under a load of 100 kg means that the core is very soft. Also, the present cover hardness is up to 60 on Shore D and thus is not hard. In general, the combination of a softer core and a softer cover results in low repulsion, i.e., an inferior flying distance. In the present golf ball, since the cover

> thickness is 1.3 to 1.8 mm which is thin and the ratio of core distortion/ball distortion is 1.0 to 1.3, a flying distance as well, as stop on the green, are good regardless of the combination of a soft core and cover. This feature of the present invention is not disclosed or taught by [GB '628], as well as the other references.

(*Id.* at 7).

On April 24, 1997, the examiner allowed the three claims of the '817 patent. (Ex. 23, Apr. 24, 1997 Office Action at 1).

**D. The '817 Patent Is Very Narrow**

Because the '817 patent is markedly similar to the prior art Bridgestone Precept EV Extra Spin golf ball, its scope was very narrow from its inception. As noted above, the manufacturing specifications for the Precept EV Extra Spin golf ball show that it embodied every property of the originally-filed Japanese application. Even as filed in the United States, the '817 patent differs only slightly from that golf ball as shown from Bridgestone's own manufacturing specifications for the ball:

- Claim 1 of the '817 patent requires a core distortion of 2.9 to 4.0 mm under a load of 100 kg – the Precept EV Extra Spin has a core distortion of 2.9 mm under a load of 100 kg (*see* Ex. 20, BSP 89622-26);
- Claim 1 of the '817 patent requires the ratio of core distortion under a load of 100 kg divided by ball distortion under a load of 100 kg to be between 1.0 and 1.3 – the Precept EV Extra Spin has a ball distortion of 2.79 under a load of 100 kg, so that the ratio of its core distortion (2.9 mm) divided by its ball distortion (2.79 mm) is 1.1 (*see* Ex. 20, BSP 89622-26);
- Claim 1 of the '817 patent requires that the cover consist of an ionomer resin as a resin component – the cover of the Precept EV Extra Spin was made from Surlyn 7930, which is an ionomer resin (*see* Ex. 20, BSP 89622-26); and

- Claim 1 of the '817 patent requires that the cover have a Shore D hardness of up to 60 – the Precept EV Extra Spin has a Shore D hardness of 52 (*see* Ex. 20, BSP 89622-26).

The only difference between Claim 1 of the '817 patent and the Precept EV Extra Spin is in cover thickness. Claim 1 requires that the cover have a thickness of 1.3 to 1.8 mm, whereas the Precept EV Extra Spin had a cover thickness of 2.0 mm – a difference of only 0.2 mm. (*See* Ex. 20, BSP 89622-26). Recent testing of Precept EV Extra Spin golf balls sold in the United States in March of 1994 and obtained by Acushnet at that time confirms that those manufacturing targets were implemented in the golf balls sold in the United States at that time. (*See* Exhibit 24). Thus, Bridgestone's own Precept EV Extra Spin comes literally within 0.2 mm of anticipating the '817 patent.

Interestingly, despite the similarity of Bridgestone's Precept EV Extra Spin golf ball to claim 1 of the '817 patent – and its anticipation of the originally-filed Japanese priority document – Bridgestone never disclosed the existence of that ball to the examiner. Bridgestone filed a single information disclosure statement during the prosecution of the '817 patent, in which it identified only three prior art patents and no golf balls. (*See* Ex. 23, Apr. 12, 1996 Information Disclosure Statement).

### E. The '817 Patent Is Anticipated By Japanese Kokai Publication No. 60-163673

I have concluded that claim 1 is invalid as anticipated by Bridgestone's own Japanese Kokai Publication No. 60-163673 ("JP '673") (Ex. 25).

The Japanese Patent Office published JP '673 on August 26, 1985, close to ten years before Bridgestone's earliest claimed foreign filing date of October 14, 1994. The unexamined application was filed by Bridgestone Corporation and names Tetsuya Shima and Michitsugu Kikuchi as the inventors. By predating the October 14, 1994 priority date claimed by Bridgestone for the '817 patent, I understand that JP '673 qualifies as prior art.

Despite the fact that JP '673 predates the '817 patent by almost ten years, the two disclosures are remarkably similar. Like the '817 patent, the disclosure of JP '673 is directed, in part, to "improved hitting feel" in solid core golf balls. (Ex. 25, JP '673 at 400). Also like the '817 patent, the named inventors on JP '673 sought to improve feel by controlling (1) the hardness of the solid core (as measured by distortion of the core under a 100 kg load) and (2) the thickness of the cover:

> by combining a solid core having the hardness of the above-described range and a cover having a flexural modulus and thickness in the foregoing range, the golf ball unexpectedly exhibited soft hitting feel but did not reduce durability or initial velocity.
>
> Then, the inventors concluded that the golf ball having the equivalent hitting feel to that of a thread-wound ball was obtained when specifying the combination of the hardness of the core and the flexural modulus and thickness of the cover.

(Ex. 25, JP '673 at 400).

The golf balls taught by both JP '673 and the '817 patent are very similar. Both teach a core made from 100 parts by weight of a cis-1,4 polybutadiene rubber, an unsaturated acid such as acrylic acid, dicumyl peroxide, and zinc oxide. (*See* Ex. 25, JP '673 at 401; Ex. 16, '817 Patent at Col. 3, ll. 42-45). Further, they both teach covers made from ionomeric resins. (*See* Ex. 25, JP '673 at 401, Tables 1-4; Ex. 16, '817 patent at col. 4, lines 44-52, Table 2).

In fact, JP '673 expressly discloses core distortions and cover thickness that are claimed by the '817 patent. For example, JP '673 provides a table – Table 4 – that lists examples of its invention with core distortions ranging from 3.3 to 3.7 mm under a load of 100 kg, which is entirely within the range of 2.9 to 4.0 claimed by the '817 patent. (Ex. 25, JP '673 at Table 4). The second identified example has a cover thickness of 1.75 mm, which is within the range of 1.3 to 1.8 claimed by the '817 patent. (Ex. 25, JP '673 at Table 4).

JP '673 does not explicitly disclose the ratio of core distortion divided by ball distortion, or the Shore D hardness of the cover. As will be shown below, however, those two properties

are inherent to the examples provided in Table 4 of JP '673. JP '673, therefore, teaches every limitation from claim 1 of the '817 patent.

**1. "A golf ball comprising a core and a cover wherein said core and said ball has a core hardness and a ball hardness respectively"**

Table 4 of JP '673 discloses golf balls with cores and covers. (Ex. 25, JP '673 at Table 4). Thus, I conclude that JP '673 discloses this limitation.

**2. "wherein said core has a distortion of 2.9 to 4.0 mm under a load of 100 kg"**

Table 4 discloses cores with a range of distortions from 3.3 mm to 3.7 mm under a 100 kg load. (Ex. 25, JP '673 at 399, Table 4). That range is entirely within the range claimed by the '817 patent. Thus, I conclude that JP '673 discloses this limitation.

**3. "the ratio of a core distortion under a load of 100 kg divided by a ball distortion under a load of 100 kg ranges from 1.0 to 1.3"**

While JP '673 does not expressly disclose a ball distortion under a load of 100 kg, this limitation is inherent in the golf ball examples shown in Table 4. Specifically, JP '673 teaches how to construct a golf ball:

> Solid cores were prepared by combining 100 parts by weight of a polybutadiene, 20 to 80 parts by weight of zinc oxide, 10 to 30 parts of acrylic acid and 0.5 to 4 parts by weight of dicumylperoxide, milling the compositions in a 1000α Banbury mixer and a roll mill, and compression molding them at 150°C for 40 minutes. Solid cores were prepared so that the diameters range 36 to 40mm and deformations range 2.0 to 3.5mm under a constant load of 100kg.
>
> Cover compositions containing 100 parts by weight of an ionomer resin and 20 parts by weight of titanium dioxide were injection molded over the above-described solid cores to form two-piece golf balls comprising covers having the flexural modulus and thickness as shown in Table 1 to Table 4 through Table 4. As ionomer resins, resins were chosen from Himilan® having various flexural modulus. (The product numbers of Himilan® used for Table 1 to Table 4 are noted in the table.) Table 1 shows the results when the solid core has a deformation of 1.8 to 2.2mm under a constant load of 100kg, Table 3 when the solid core has a deformation of 2.8 to 3.2mm under a constant load of 100kg and

> Table 4 when the solid core has a deformation of 3.3 to 3.7mm under a constant load of 100kg.

(Ex. 25, JP '673 at 401).

Acting under my supervision, Acushnet employees used those teachings to construct golf ball cores with (a) a range of core diameters (36 mm to 40 mm) disclosed in the specification and (b) distortions from 3.3 mm to 3.7 mm under a 100 kg load, as disclosed in Table 4. (JP '673 at 399, Table 4). For the cover, they used a 1.75 mm thick blend of Himilan 1855 and titanium dioxide from Table 4.

**a. Core Composition**

As noted above, the specification teaches a composition "... containing 100 parts by weight of a polybutadiene containing 1-4 cis-bond, 10 to 30 parts by weight of acrylic and/or methacrylic acid, 10 to 70 parts by weight of zinc oxide, and 0.5 to 6 parts by weight of peroxide ...." The specification also teaches the use of metallic salts of unsaturated carboxylic acids (i.e. acrylic and methacrylic acids) and so zinc diacrylate (ZDA) was used in the formulas in place of acrylic acid. The stoichiometric equivalent of the formulation taught in the specification using zinc diacrylate is as follows:

- 100 parts of polybutadiene containing 1-4 cis-bond
- 14.4 to 43.2 parts of ZDA
- 4.4 to 64.4 parts of zinc oxide (compensating for the zinc oxide used to form ZDA)
- 0.5 to 6 parts of peroxide

The actual recipes used to make the four cores used in this experiment were:

**Sample Set No. 1: 36 mm diameter core, distortion of 3.3 mm @ 100 kg**

- 100 parts of polybutadiene (Dow BR 1220)
- 25 parts of ZDA
- 5 parts of zinc oxide
- 0.5 parts of peroxide (Trigonox 265)
- 0.2 parts orange color masterbatch
- 18 parts Barium Sulfate (Polywate 325)

**Sample Set No. 2: 36 mm diameter, distortion of 3.7 mm @ 100 kg**

- 100 parts of polybutadiene (37 parts Bayer CB23 & 63 parts Dow BR 1220)
- 23 parts of ZDA
- 5 parts of zinc oxide
- 0.6 parts of peroxide (Trigonox 265)
- 0.2 parts yellow color masterbatch
- 19 parts Barium Sulfate (Polywate 325)
- 3 parts Aktiplast PP

**Sample Set No. 3: 40 mm diameter, distortion of 3.3 mm @ 100 kg**

- 100 parts of polybutadiene (Dow BR 1220)
- 25 parts of ZDA
- 5 parts of zinc oxide
- 0.5 parts of peroxide (Trigonox 265)
- 0.2 parts orange color masterbatch
- 18 parts Barium Sulfate (Polywate 325)

**Sample Set No. 4: 40 mm diameter, distortion of 3.7 mm @ 100 kg**

- 100 parts of polybutadiene (88 parts Bayer CB23 & 12 parts Dow 1220)
- 22 parts of ZDA
- 21 parts of zinc oxide
- 0.5 parts of peroxide (Trigonox 265)
- 0.6 parts blue color masterbatch
- 0.2 parts black color masterbatch
- 1 part Aflux 16

**b. Core Molding**

The cores were molded in a compression mold at 335° F for 11 minutes. The cores were molded in molds that were slightly larger than the desired core diameter and then ground to the desired size using a centerless grinding machine. The final diameters are listed below.

Distortion @ 100 kg was measured of an MTS compression/tensile tester Model Sintech 5/G, using an MTS load cell model 4501011/8 rated at 2000 N. The distortion test was performed at a crosshead speed of 25.4 mm/min (1 inch/min).

**Sample Set No. 1: 36 mm, distortion of 3.3 mm @ 100 kg**

| Sample | Core Diameter | Core Distortion at 100 kg |
|---|---|---|
| Core 1 | 36 mm | 3.3 mm |
| Core 2 | 36 mm | 3.3 mm |
| Core 3 | 36 mm | 3.3 mm |
| Core 4 | 36 mm | 3.3 mm |
| Core 5 | 36 mm | 3.3 mm |
| Core 6 | 36 mm | 3.3 mm |

**Sample Set No. 2: 36 mm, distortion of 3.7 mm @ 100 kg**

| Sample | Core Diameter | Core Distortion at 100 kg |
|---|---|---|
| Core 1 | 36 mm | 3.7 mm |
| Core 2 | 36 mm | 3.7 mm |
| Core 3 | 36 mm | 3.7 mm |
| Core 4 | 36 mm | 3.7 mm |
| Core 5 | 36 mm | 3.7 mm |
| Core 6 | 36 mm | 3.7 mm |

**Sample Set No. 3: 40 mm, distortion of 3.3 mm @ 100 kg**

| Sample | Core Diameter | Core Distortion at 100 kg |
|---|---|---|
| Core 1 | 40.3 mm | 3.3 mm |
| Core 2 | 40.3 mm | 3.2 mm |
| Core 3 | 40.3 mm | 3.2 mm |
| Core 4 | 40.3 mm | 3.2 mm |
| Core 5 | 40.3 mm | 3.2 mm |
| Core 6 | 40.3 mm | 3.3 mm |

**Sample Set No. 4: 40 mm, deformation of 3.7 mm @ 100 kg**

| Sample | Core Diameter | Core Distortion at 100 kg |
|---|---|---|
| Core 1 | 40.2 mm | 3.7 mm |
| Core 2 | 40.2 mm | 3.7 mm |
| Core 3 | 40.2 mm | 3.7 mm |
| Core 4 | 40.2 mm | 3.7 mm |
| Core 5 | 40.2 mm | 3.7 mm |
| Core 6 | 40.2 mm | 3.7 mm |

### c. Cover Material Formulation

As noted above, the reference teaches cover compositions containing 100 parts by weight of an ionomer resin and 20 parts by weight of titanium dioxide. Further, Table 4 teaches Himilan 1855 as an example of ionomer resin. We made the blend of 20 parts titanium dioxide in 100 parts of Himilan 1855 using a Werner & Pfleiderer Twin Screw Compounder type ZSK-30. The cover material was injection molded into half shells for compression molding around the sample cores. Half shells were made in two sizes to mold onto the two different core diameters. A 2-inch diameter sample disc was compression molded to measure Shore D hardness. The hardness was measured 4 days after molding. The Shore D hardness was 51.0 (average of 5 measurements, 51.0, 50.8, 50.6, 50.3, 52.4). While I understand that Shore D hardness may change within two weeks of molding, it will not increase by more than a few Shore D points, so I would expect the measurements at two weeks to be under 60.

### d. Cover Molding

Covers were compression molded onto the four sample sets. In all cases a cover thickness of 1.75 mm was achieved. The two 36 mm core types were cover molded in a 41 mm mold and ground in a centerless grinding machine to the desired diameter of 39.5 mm. The two 40 mm core types were cover molded in a 43.8 mm mold.

### e. Ball Properties

The diameter, 100 kg distortion, and cover hardness of the molded balls were measured. The data is below.

**Sample Set No. 1:**

| Sample | Ball Diameter | Cover Thickness | 100 kg Distortion | Core Distortion/Ball Distortion | Cover Shore D Hardness |
|---|---|---|---|---|---|
| Ball 1 | 39.5 mm | 1.75 mm | 3.0 mm | 1.10 | 53.8 |
| Ball 2 | 39.5 mm | 1.75 mm | 3.0 mm | 1.10 | 54.5 |
| Ball 3 | 39.5 mm | 1.75 mm | 3.1 mm | 1.06 | 55.0 |
| Ball 4 | 39.5 mm | 1.75 mm | 3.0 mm | 1.10 | 55.2 |
| Ball 5 | 39.5 mm | 1.75 mm | 3.0 mm | 1.10 | 54.7 |
| Ball 6 | 39.5 mm | 1.75 mm | 3.0 mm | 1.10 | 55.0 |

**Sample Set No. 2:**

| Sample | Ball Diameter | Cover Thickness | 100 kg Distortion | Core Distortion/Ball Distortion | Cover Shore D Hardness |
|---|---|---|---|---|---|
| Ball 1 | 39.5 mm | 1.75 mm | 3.4 mm | 1.09 | 54.4 |
| Ball 2 | 39.5 mm | 1.75 mm | 3.4 mm | 1.09 | 54.9 |
| Ball 3 | 39.5 mm | 1.75 mm | 3.4 mm | 1.09 | 54.6 |
| Ball 4 | 39.5 mm | 1.75 mm | 3.4 mm | 1.09 | 54.0 |
| Ball 5 | 39.5 mm | 1.75 mm | 3.4 mm | 1.09 | 54.5 |
| Ball 6 | 39.5 mm | 1.75 mm | 3.4 mm | 1.09 | 54.8 |

**Sample Set No. 3:**

| Sample | Ball Diameter | Cover Thickness | 100 kg Distortion | Core Distortion/Ball Distortion | Cover Shore D Hardness |
|---|---|---|---|---|---|
| Ball 1 | 43.8 mm | 1.75 mm | 3.1 mm | 1.06 | 51.5 |
| Ball 2 | 43.8 mm | 1.75 mm | 3.1 mm | 1.03 | 51.0 |
| Ball 3 | 43.8 mm | 1.75 mm | 3.1 mm | 1.03 | 51.9 |
| Ball 4 | 43.8 mm | 1.75 mm | 3.0 mm | 1.07 | 50.2 |
| Ball 5 | 43.8 mm | 1.75 mm | 3.0 mm | 1.07 | 52.2 |
| Ball 6 | 43.8 mm | 1.75 mm | 3.1 mm | 1.06 | 52.1 |

**Sample Set No. 4:**

| Sample | Ball Diameter | Cover Thickness | 100 kg Distortion | Core Distortion/Ball Distortion | Cover Shore D Hardness |
|---|---|---|---|---|---|
| Ball 1 | 43.7 mm | 1.75 mm | 3.6 mm | 1.03 | 49.8 |
| Ball 2 | 43.7 mm | 1.75 mm | 3.6 mm | 1.06 | 49.2 |
| Ball 3 | 43.7 mm | 1.75 mm | 3.6 mm | 1.03 | 49.5 |
| Ball 4 | 43.7 mm | 1.75 mm | 3.6 mm | 1.03 | 49.5 |
| Ball 5 | 43.7 mm | 1.75 mm | 3.6 mm | 1.06 | 49.6 |
| Ball 6 | 43.7 mm | 1.75 mm | 3.6 mm | 1.06 | 49.2 |

Based on that data, I conclude that the examples in Table 4 of JP '673 inherently disclose this limitation.

The results of my tests were not surprising. The ratio of core distortion divided by ball distortion is neither a new concept nor was it invented by Bridgestone. All solid golf balls inherently have a ratio of core distortion divided by ball distortion. The ratio claimed by the '817 patent – 1.0 to 1.3 – means only that the golf ball, which consists of a core plus a cover, is

going to have the same or slightly less deflection under a 100 kg load than the deflection of the core alone.[5]

The claimed ratio is self-evident when one considers the structure of the golf balls such as those taught by the '817 patent. As acknowledged by Bridgestone during prosecution, the '817 patent claims a soft core. (Ex. 23, Mar. 4, 1997 Amendment at 7) ("The present core distortion of 2.9 to 4.0 mm under a load of 100 kg means that the present core is very soft."). The cover material claimed by the '817 patent is a soft ionomer resin, but would be expected to reduce the core distortion. In fact, one of the primary reasons for putting the ionomer cover on the core is to reduce the distortion of the core at club impact. Thus, when you cover a soft core with an ionomer, the ball necessarily will deflect by either the same amount or slightly less than the core alone. As a result, the ratio of core distortion divided by ball distortion will be either 1 (when the distortion of the ball is the same as the core) or slightly greater than 1 (when the distortion of the ball is slightly less than the distortion of the core). Further, the cover taught by the '817 patent is a relatively thin. (*See* Ex. 23, Mar. 4, 1997 Amendment at 7) ("the cover thickness is 1.3 to 1.8 mm which is thin"). With a thin cover, such as the 1.75 mm cover disclosed in Table 4 of JP '673, the effect on ball distortion will be even less, so that the ratio will be closer to 1.

For example, the Precept EV Extra Spin provides an example of the ratio. As shown above, the Precept EV Extra Spin golf ball used the same basic core and cover as those taught by the '817. The one exception is that the cover of the Precept EV Extra Spin is 2.0 mm – 0.2 mm outside the range claimed by the '817 patent. If anything, one would expect the thicker cover to decrease the ball's distortion relative to the core distortion and drive the ratio higher. Nevertheless, the ratio for the Precept EV Extra Spin was only 1.1, well within the claimed range. (*See* Ex. 24).

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[5] Note that even a one-piece golf ball would fall within the claimed range. In that case, the core and the ball are the same, and thus have the same distortion. As a result, the ratio of core distortion divided by ball distortion would be a number divided by itself, which is 1.

Yet another such example is provided by GB '628. GB '628 discloses an example of a control core with a core distortion of 2.61 mm. (Ex. 26, GB '628 at 15). It further discloses golf balls with distortions under a 100 kg load of 2.39 mm to 2.57 mm, made from the same list of ingredients and in the same amounts as the control core. (Ex. 26, GB '628 at 10, 14). By dividing the control core distortion by the disclosed ball distortions, GB '628 teaches a ratio of 1.01 to 1.09. The lower value is the control core distortion of 2.61 mm divided by a ball distortion of 2.57 mm, while the higher value is the control core distortion of 2.61 mm divided by the ball distortion of 2.39 mm. The range of distortion ratios taught by GB '628 is quite narrow and entirely within the range claimed by the '817 patent.

As demonstrated by the above examples, the claimed distortion ratio is not novel and was not invented in the '817 patent. JP '673, the Precept EV Extra Spin, and GB '628 – all from Bridgestone – all possessed the claimed ratio property before it was taught by the '817 patent and all have ratios slightly greater than 1 and well under 1.3.

In my experience manufacturing golf balls and in the experience of the golf ball manufacturers to whom I have spoken, it is generally understood that the addition of an ionomer cover to a core will decrease the distortion of the golf ball. The basic physics of golf balls dictate that a soft core covered by an ionomer cover will have a distortion under a 100 kg load that is either the same or slightly less than the distortion of the core itself, resulting in a distortion ratio that is 1 or slightly greater than 1.

**4. "said cover consists of an ionomer resin as a resin component"**

As noted above, Table 4 of JP '673 discloses the use of Himilan 1856 and 1855 in the cover. (Ex. 25, JP '673 at 401, Table 4). Himilan® is the trade name for a family of ionomer resins manufactured in Japan by DuPont-Mitsui Polychemical Co., Ltd., which are equivalent to the Surlyn® family of ionomer resins manufactured in the United States by DuPont. While I understand that the parties dispute whether this limitation in the '817 patent allows blends of ionomer resins as the resin component, there is no dispute that this limitation is met by a cover

whose resin component is comprised of a single ionomer resin, as shown in Table 4. Thus, I conclude that JP '673 discloses this limitation under either party's proposed claim construction.

**5. "said cover ... has a thickness of 1.3 to 1.8 mm"**

As discussed above, Table 4 of JP '673 discloses specific examples with cover thicknesses of 1.75 mm on golf balls that also meet the other limitations of claim 1 of the '817 patent. (Ex. 25, JP '673 at Tables 1-4). Thus, I conclude that JP '673 discloses this limitation.

**6. "said cover ... has ... a Shore D hardness of up to 60"**

I understand the limitation "said cover ... has ... a Shore D hardness of up to 60" to mean that the hardness of the cover ***on the ball*** as measured with a Shore D durometer must be 60 or less. I understand that Bridgestone, however, has taken the position that the cover Shore D hardness refers to the hardness of the cover material, as measured by forming a plaque or button of the cover material and then measuring that plaque or button with a Shore D durometer pursuant to ASTM Standard D 2240. Under either method, I conclude that JP '673 discloses this limitation.

Because JP '673 is silent as to the Shore D hardness of the cover as measured on the ball, I again relied on physical golf balls constructed according to the teachings of JP '673 as described above. JP '673 states that

> Cover compositions containing 100 parts by weight of an ionomer resin and 20 parts by weight of titanium dioxide were injection molded over the above-described solid cores to form two-piece golf balls comprising covers having the flexural modulus and thickness as shown in Table 1 through Table 4. As ionomer resins, resins were chosen from Himilan® having various flexural modulus. (The product numbers of Himilan® used for Table 1 to Table 4 are noted in the table.).

(Ex. 25, JP '673 at 401). Following that teaching, I constructed two separate covers using 100 parts by weight each of Himilan 1856 and Himilan 1855 as the ionomer resin as shown in Table 4. The covers also included 20 parts by weight of titanium dioxide. Relying on Table 4, I used a thickness of 1.75 mm for the covers. I then placed each individual golf ball into a Shore D durometer as described above and acquired a Shore D measurement for each ball. Each result

was less than 60, as shown above. Thus, although JP '673 does not explicitly disclose a Shore D cover hardness within the claimed range as measured on the ball, that property is inherent to the examples in Table 4 using Himilan 1855.

That limitation is also inherent under Bridgestone's proposed Shore D measurement method. In addition to measuring the cover hardness on the ball, I formed plaques of the cover compositions described above using Himilan 1855 and measured them with a Shore D durometer according to ASTM Standard D 2240. Again, the result was less than 60 for each sample, as shown above. Thus, I conclude that this limitation is inherently disclosed by JP '673.

Based on the foregoing analysis, I conclude that JP '673 invalidates claim 1 of the '817 patent.

### F. Alternatively, The '817 Patent Is Invalid As Obvious In Light Of JP '673

The only limitations from the '817 patent not explicitly taught by JP '673 are (1) the claimed ratio of core distortion divided by ball distortion and (2) the Shore D hardness of the cover. As shown above, however, those limitations were neither novel nor invented by Bridgestone – golf balls constructed from Table 4 of JP '673 meet those limitations, as do Bridgestone's Precept EV Extra Spin golf ball and the golf balls taught in Bridgestone's GB '628 reference. Even if JP '673 did not inherently disclose those limitations, however, it would have been obvious to one of ordinary skill in the art.

#### 1. The Claimed Ratio Of Core Distortion Divided By Ball Distortion Would Have Been Obvious To One Of Ordinary Skill In The Art

As shown by Bridgestone's own Precept EV Extra Spin golf ball and GB '628 reference, the basic physics of placing thin ionomer cover over a soft core dictate that the ball will distort slightly less than the core alone, due to the restraining effect of the cover layer on the core. Thus, any ratio of core distortion divided by ball distortion for such a construction would be either 1 (where the ball distortion and core distortion are the same) or slightly greater than 1

(where the ball distortion is slightly less than the core distortion). Through an understanding of the basic physics of ball construction and/or knowledge of the Precept EV Extra Spin golf ball, one of ordinary skill in the art of golf ball manufacturing would appreciate that the ratio of core distortion divided by ball distortion should be between 1.0 and 1.3, as they did for the similar-constructions used by the Precept EV Extra Spin golf ball and in the GB '628 publication.

#### 2. The Claimed Range of Shore D Hardness Would Have Been Obvious To One Of Ordinary Skill In The Art

As further shown by Bridgestone's own Precept EV Extra Spin golf ball, it would have been obvious to use a cover with a Shore D hardness of up to 60 with a soft core construction. The soft core is designed to improve feel; a cover with a Shore D hardness of up to 60 contributes to the feel, whereas a harder cover would detract from it. This fact was recognized in the Precept EV Extra Spin, which used a cover with a Shore D hardness of 52.

## VII. THE '707, '834, AND '791 PATENTS

### A. Overview of the Patents

I will now address three related Bridgestone patents: U.S. Patent No. 5,782,707 (the '707 Patent) (Ex. 25), U.S. Patent No. 5,803,834 (the '834 Patent) (Ex. 26) and U.S. Patent No. 6,6791,791 (the '791 Patent) (Ex. 27). These three patents claim golf balls having a core with a surface harder than the center, where the hardness of the core increases radially outward from the center, sometimes increasing by a specific amount. This feature is referred to in the art as a hardness gradient in the core. In particular, a core's "hardness gradient" is a measurement of how the hardness of the core's rubber changes from the center of the core to its surface.

#### 1. The '707 Patent

The '707 patent, entitled a "Three-Piece Solid Golf Ball," was applied for at the PTO on March 10, 1997, claiming priority to Japanese patent application no. 8-082121, filed March 11, 1996. The PTO issued the '707 Patent to Bridgestone on July 21, 1998, naming as the inventors Hisashi Yamagishi and Hiroshi Higuchi. The claims of the '707 are directed to the following

combination of three elements: (1) a core with a particular hardness distribution, whose key feature is a hardness gradient of 8-20 degrees, (2) a three-piece structure with a hard intermediate layer between the core and soft cover, and (3) dimple coverage of at least 62%.

**2. The '834 Patent**

The '834 patent, entitled a "Two-Piece Golf Ball," was applied for at the PTO on February 27, 1997, claiming priority to Japanese patent application no. 8-071135, filed March 1, 1996 . On September 8, 1998, the PTO issued the '834 Patent to Bridgestone. The patent names Hisashi Yamagishi and Jun Shindo as the inventors. This patent generally claims the combination of: (1) a core with a particular hardness profile, whose key features are a hardness gradient of 8-20, and a relatively consistent hardness within the outer 5mm of the core, (2) a two piece structure with a hardness difference between the core and the cover, and a specified cover thickness and, (3) 360 – 450 dimples in the cover.

**3. The '791 Patent**

On January 20, 2004, over five and a half years after Bridgestone's '707 Patent issued, the PTO issued the '791 Patent, entitled "Golf Ball," to Bridgestone. The only named inventor of the '791 Patent is Hideo Watanabe. The '791 Patent, which like the '707 Patent discloses a three-piece solid golf ball, has claims directed toward the following combination of three elements: (1) a core with a hardness profile which is gradually increasing and a gradient of at least 22 degrees, (2) a three-or-more-piece structure whose key feature is that at least one intermediate layer is harder than the cover and the core, and (3) the use of a compounding agent such as zinc pentachlorothiophenol in the core formulation.

The '791 patent was filed in the PTO on June 15, 2001 and claimed priority to Japanese patent application No. 2000-1960640, filed June 26, 2000.

The original United States application for the '791 Patent claimed a core hardness gradient of "at least 18 degrees," and it only claimed cores with a "gradually increasing" hardness. The core gradient claim was rejected three times by the PTO. In the third office

action, the examiner rejected most of the '791's claims citing Bridgestone's '707 patent as anticipating the '791 claims. In particular, the examiner observed that the '707 patent taught a core with a hardness gradient of 8 to 20. The applicant then amended the claims in response to this office action and replaced the claim of a core gradient of at least 18 with a claim of a gradient of at least 22. The applicant argued to the PTO that, because the '707 patent did not show core gradients over 22, it did not anticipate the amended claim. In response to this, the examiner granted the claims of the '791 patent.

## B. Overview of the Technology

### 1. Hardness Gradients in Rubber Chemistry

I have reviewed the expert report of Dr. Koenig, and I agree with him that formation of hardness gradients in cured rubbers is well-known in rubber chemistry. Scientists and engineers working on rubber molding have known about hardness gradients for decades. Much effort has gone into measuring and modeling the extent of cure in a molded rubber part. Also, academics have written papers on the modeling of the extent of cure in molded rubber parts.[6]

### 2. Hardness Gradients in the Golf Ball Art

Hardness gradients were known to those in the golf ball field before the earliest priority date of the '707 patent (March 1996). The formation of a hardness gradient in the core is a natural result of the manufacturing process for solid rubber golf balls, and this too was well-known before the Bridgestone patents.

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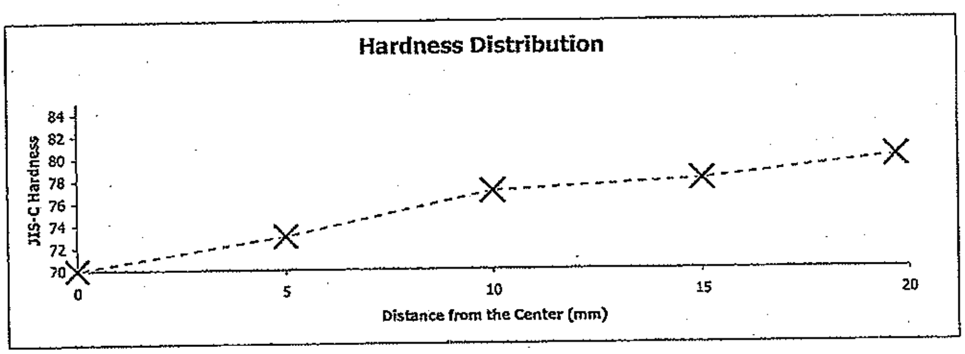
[6] *See* Ex. 28, M.H.R. Ghoreishy & G. Naderi, Three-dimensional Finite Element Modeling of a Rubber Curing Process, 37 J. Elastomers & Plastics 37 (Jan. 2005). In 1980, Prentice and Williams published a paper on modeling the state of cure in a vulcanized rubber article. *See* Ex. 29, G.A. Prentice & M.C. Williams, Numerical Evaluation of the State of Cure in a Vulcanizing Rubber Article, 53 Rubber Chem. Tech. 1023 (1980). In 1990, Kau and Petrusha published a paper on the formation gradients of other physical properties similar to hardness gradients during the molding process. *See* Ex. 30, H.T. Kau & L.A. Pertusha, Dimensional Stability and Property Gradients in Thick Sheet Molding Compound (SMC) Sections, 30 Polymer Engineering & Sci. 805 (July 1990). Lee has published research on calculating the temperature gradient created by the molding process in 1989, as well. *See* Ex. 31, C. Lee, Reaction and Thermal Analysis for SMC (Sheet Molding Compound) Molding in Complicated Geometries, 29 Polymer Engineering & Sci. 1051 (August 1989).

For example, U.S. Patent No. 6,645,496 (Ex. 32), which claimed priority from a 1993 Japanese patent application, shows the hardness distribution of example balls in Table 2 as follows:

TABLE 2

| | | | Comparative Example No. | | | | |
|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 |
| Core | Formulation | BR-01 | 100 | 100 | 100 | 100 | 100 |
| | | Zinc diacrylate | 30 | 35 | 30 | 38 | 18 |
| | | Zinc Oxide | 19 | 18 | 19 | 17.5 | 27 |
| | | Antioxidant | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| | | Dicumyl peroxide | 1.2 | 2.0 | 2.0 | 1.2 | 2.2 |
| | Vulcanizing condition | | 140° C. × 25 min + 165° C. × 8 min | 163° C. × 25 min | 150° C. × 35 min | 160° C. × 30 min | 165° C. × 30 min |
| | Hardness distribution | Center | 74 | 70 | 69 | 73 | 38 |
| | | Location which is 5 mm away from the center | 75 | 73 | 75 | 76 | 54 |
| | | Location which is 10 mm away from the center | 77 | 77 | 77 | 78 | 58 |
| | | Location which is 15 mm away from the center | 78 | 78 | 80 | 84 | 65 |
| | | Surface | 79 | 80 | 82 | 88 | 69 |
| | Compression strength | (mm) | 2.95 | 3.05 | 2.90 | 2.80 | 5.00 |
| Cover | Formulation | Hi-milane 1605 | 50 | 50 | 50 | 50 | 50 |
| | | Hi-milane 1706 | 50 | 50 | 50 | 50 | 50 |
| | Stiffness | Kgf/cm² | 3000 | 3000 | 3000 | 3000 | 3000 |
| | Cover thickness | mm | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |

Table 2 shows the hardness at several points between the center and the surface of the core.




Other examples of patents that disclose the presence of a core gradient in a golf ball prior to 1996 include U.S. Patent No. 4,714,253 (Ex. 33) (1987, showing a difference in hardness between the core center and a point 5 to 10 mm from the core center); U.S. Patent No. 5,002,281 (Ex. 34) (1991, showing a hardness at the core center and a point 5 to 10 mm from the core center); U.S. Patent No. 5,184,828 (Ex. 35) (1993, showing hardness in 5mm increments between the core

center and surface); U.S. Patent No. 5,711,723 (Ex. 36) (1995 application, showing a hardness gradient of not more than 4); and U.S. Patent No. 5,730,663 (Ex. 37) (1995 application, showing the hardness in 5mm increments between the core center and surface).

Still other patents show a gradient of greater than 22 degrees before the earliest priority date of the'791 patent (2000). Bridgestone's own U.S. Patent No. 5,830,085 (Ex. 38), for example, showed the use of a gradient of 5 to 25 degrees in a three-piece golf ball in 1998. United States Patent No. 6,390,935 (Ex. 39), filed in 1999, taught a gradient of 8 to 25 degrees. And U.S. Patent No. 6,386,993 (Ex. 40), also filed in 1999, claimed a gradient of 20 to 40 degrees.

### 3. Hardness Gradient in the Core Manufacturing Process

Solid golf ball cores are manufactured through a curing process. During the curing of a golf ball core, raw polybutadiene is mixed with, among other things, a crosslinking agent or catalyst and heated in a mold. The use of peroxide catalysts, such as dicumyl peroxide, is common in the golf ball art. As the mold is heated, the peroxide breaks down, forming free radicals, which then cause the strands of polybutadiene to form bonds, or "cross-link," with each other. As the temperature increases and the curing time increases, the crosslinking increases. Crosslinking increases the hardness of rubber.

During the core manufacturing process, the rubber is heated by conduction from the hot metal mold. Heat is transferred from the mold to the surface of the cores, and then is conducted inwards. Because polybutadiene has a low thermal conductivity, the surface of the core heats up appreciably faster than the center. Therefore, there is a pronounced temperature difference in the core, with the outside of the core initially being much hotter than the center.

Conventional core molding processes are usually stopped before the core reaches complete thermal equilibrium. Consequently, the outer portions are heated to temperatures where peroxide decomposition and rubber crosslinking occurs for a longer time than the inner

portions. As a result, greater crosslinking occurs at the outside of the core than at the inside. Thus, the outside of the core becomes harder than the center.

Core hardness gradients become larger as the core curing times are decreased, where other influencing factors remain constant. Most golf ball manufacturers try to produce as many balls as they can in a given amount of time. Therefore, there is a tendency in the industry to use the minimum amount of cure time which results in a good product. This results in balls which have hardness gradients.

#### 4. Measuring the Core Hardness Gradient

As already discussed, core hardness gradient is a measurement of how the hardness of the core rubber changes from the center of the core to the surface of the core.

Those in the golf ball art use an instrument called a durometer with a specially-shaped indenter to measure "hardness." The indenter is pressed against the core's surface with a defined force, and the durometer measures the amount of deflection of the surface in response to the force. This method of testing core hardness is described in various standards and specifies unique indenters and forces. JIS-C hardness refers to a standard published by the Japan Industry Standard. (*See* Ex. 41.) Shore-D hardness refers to a standard published by ASTM, International. (*See* Ex. 42.) The application of these tests to golf ball components is well-known in the golf ball art. It is understood that these tests are only repeatable to within several degrees, as the standard deviation within a laboratory is known to be roughly 0.8 degrees Shore D, and the reproducibility for tests conducted at different laboratories is roughly 16%.[7] Consequentially, a variation of several degrees between repeated tests of the same specimen is to be expected.

The core surface hardness is taken by first removing the golf ball's cover and intermediate layer, and placing the durometer directly on the core surface. In order to measure hardness at the center of the core, the core is first cut in half. *See* '707 Patent, Col. 7, ll. 8-12.

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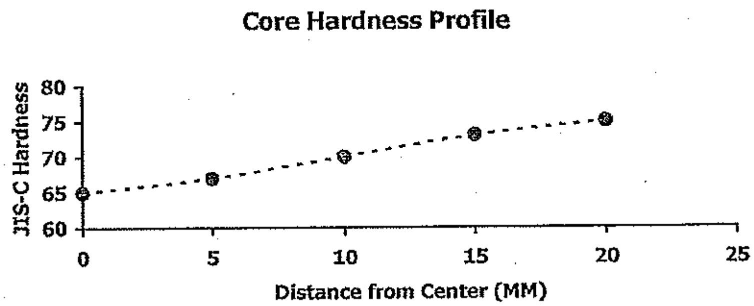
[7] *See* Ex. 42, ASTM D-2240, Table 4

The durometer is then applied to the center of the core. The hardness can be measured at other points between the center and the surface, as well. If the hardness is taken at many points between the center and the surface, it can be plotted, showing a hardness profile, as follows:




## VIII. UNITED STATES PATENT NO. 5,782,707

The '707 patent discloses a three-piece solid golf ball comprising a solid core, an intermediate layer and a cover. Claim 1, the only asserted claim, reads:

> A three piece solid golf ball of the three layer structure comprising a solid core, an intermediate layer and a cover having a plurality of dimples in the ball surface wherein the solid core, intermediate layer, and cover each have a hardness as measured by a JIS-C scale hardness meter wherein the core center hardness is up to 75 degrees, the core surface hardness is up to 85 degrees, the core surface hardness is higher than the core center hardness by 8 to 20 degrees[8], the intermediate layer hardness is higher than the core surface hardness by at least 5 degrees, and the cover hardness is lower than the intermediate layer hardness by at least 5 degrees, and the dimples occupy at least 62% of the ball surface.

('707 Pat., Col. 10, ll. 55-67).

### A. The '707 patent is anticipated by Bridgestone's 1994 Altus Newing Massy Golf Ball

I have concluded that claim 1 is invalid as anticipated by Bridgestone's own Altus Newing Massy golf ball. It is my understanding that Bridgestone sold the Altus Newing Massy in Japan since at least the fall of 1994 and that the Altus Newing Massy ball has been known and

[8] A degree is a unit of measurement on the JIS-C scale. JIS-C hardness is measured on a scale of zero to one hundred degrees.

used by Acushnet employees in the United States since November 1994. *See* AB 0004586-88. Therefore, I have treated the Altus Newing Massy as prior art under 35 U.S.C. § 102.

I created a protocol for testing of prior art golf balls. Following my direction, Acushnet engineers tested six 1994 Altus Newing Massy golf balls in accordance this protocol on equipment that I personally inspected to perform the tests. The tests performed were done properly and objectively, and in accordance with the hardness testing prescribed in the '707 patent.[9] I have reproduced the raw data obtained by these tests below, as well as a table containing my analysis of this data.

**1994 ALTUS NEWING MASSY MEASURED VALUES**[10]

| Sample No. | 1 | 2 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| **Cover Hardness (JIS-C)** | 80.8 | 80.8 | 81.3 | 81.1 | 79.8 |
| | 82.3 | 81.8 | 80.7 | 81.3 | 81.1 |
| | | | | | |
| **Intermediate Layer Hardness (JIS-C)** | 97.4 | 97 | 97.1 | 97.4 | 97.1 |
| | 97.3 | 96.5 | 97.5 | 96.8 | 97.2 |
| | | | | | |
| **Core Surface Hardness (JIS-C)** | 75.5 | 78 | 77.2 | 75.9 | 77.2 |
| | 76.6 | 77 | 77.5 | 76.3 | 77.6 |
| | | | | | |
| **Core Center Hardness (JIS-C)** | 66.1 | 66.1 | 64.6 | 66 | 63.2 |

**1994 ALTUS NEWING MASSY COMPARISON TO '707 PATENT**

| Sample No. | 1 | 2 | 4 | 5 | 6 |
|---|---|---|---|---|---|

[9] One of the six sample balls, sample number three, is not listed above. Sample three had a core hardness gradient of 5.75 degrees. This is not significant as some golf balls in the same lot may vary from the others. I would expect to see variation in the hardness gradients in a sampling of Altus Newing balls. This does not affect my opinion that the '707 is invalid based on the Altus Newing Massy, as all the other sample balls met each element of claim 1.

[10] This table shows the raw test data. The results of two cover and intermediate layer hardness measurements, measured once at each pole, are shown here. The results of two core surface hardness measurements, again taken once at each pole, are also shown here. Core center hardness was measured once, at the core center. When more than one measurement was taken, the average values are used in the calculations below.

| | | | | | |
|---|---|---|---|---|---|
| **wherein the core center hardness is up to 75 degrees,** | 66.1 | 66.1 | 64.6 | 66 | 63.2 |
| **the core surface hardness is up to 85 degrees,** | 76.05 | 77.5 | 77.35 | 76.1 | 77.4 |
| **the core surface hardness is higher than the core center hardness by 8 to 20 degrees** | 9.95 | 11.4 | 12.75 | 10.1 | 14.2 |
| **The intermediate layer hardness is higher than the core surface hardness by at least 5 degrees,** | 21.3 | 19.25 | 19.95 | 21 | 19.75 |
| **and the cover hardness is lower than the intermediate layer hardness by at least 5 degrees,** | 15.8 | 15.45 | 16.3 | 15.9 | 16.7 |

My opinion, based on the results of these tests, is that the Altus Newing Massy golf ball includes each and every limitation of claim 1 of the '707 patent, as follows:

- All five balls had a core center hardness between 63 and 67.
- The average core surface hardness, measured at several points on the surface, fell between 76 and 78 degrees.
- The core surface hardness was always higher than the core center hardness by 8 to 20 degrees.
- The intermediate layer hardness, measured at two points on the surface of the sphere, was at least nineteen degrees harder than the core surface.
- The cover hardness, measured on the ball in two locations, was lower than the intermediate layer by at least fifteen degrees.
- Dimple coverage was 76.3%.

It is my opinion that these tests accurately reflect the properties of the golf balls when they were sold. Although the balls are over twelve years old, their multi-layer construction protects the core rubber from the elements, thereby preventing material degradation. It is known in the golf ball art that a polybutadiene rubber core can be adversely affected by moisture and possibly oxygen. But the Altus Newing Massy is encased in an ionomer resin cover and intermediate layer,[11] which would protect the core from the negative affects of moisture and oxygen permeation. In fact, golf ball cores are almost always covered with a material such as an ionomer, particularly the harder ionomers, for the very reason that this provides protection against the penetration of water vapor, thus keeping the core properties from degrading with time.[12] Therefore, many golf balls today have a polyurethane cover and an ionomer intermediate layer; and, as it is known in the art, one of the important functions of the ionomer intermediate layer is to protect the core from moisture penetrations.[13] While a suspected mechanism of core degradation may also be oxidation that can occur, this phenomenon has also been studied, and it has been noted in the art that ionomers act as an oxygen barrier in addition to a water barrier.[14]

My conclusion in this regard is supported by prior competitive testing performed on the Altus Newing Massy ball at Acushnet. AB 0004586-88, for example, shows prior testing of balls acquired by Acushnet in 1994, which indicates that it had a core surface hardness of 77 degrees Shore C. AB 0004583-85 also shows testing of core hardness on balls acquired in 1994, which had a surface hardness of 75 degrees Shore C. The average core surface hardness reported in the table above is 76.9 degrees, which is almost the same.

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[11] *See* AB 0004587.

[12] Ex. 44, U.S. Patent Application No. 2006/0128505, "Golf ball layers having improved barrier properties."

[13] Ex. 45, Plastics Design Library, "Permeability and Other Film Properties of Plastics and Elastomers."

[14] Ex. 46, U.S. Patent No. 6,398,668, col 1, lines 66-67.

### B. The '707 Patent is Obvious in Light of European Patent 0 633 043

It is also my opinion that claim 1 of the '707 patent is invalid based on obviousness in light of the combination of European Patent 0 633 043, which discloses the claimed intermediate layer and core, and the knowledge of one skilled in the art.

EP 0 633 043 ("EP 043") (Ex. 47) issued on April 6, 1997 to Bridgestone, naming Hiroshi Higuchi, Hisashi Yamagishi, and Yoshinori Egashira as inventors of this patent. Mr. Yamagishi and Mr. Higuchi are also the two inventors on the '707 Patent. The EP '043 claims priority to a Japanese application filed in August 1993. As EP '043 claims priority before the priority date of the '707 patent (March 1996), I understand that EP '043 is prior art under 35 U.S.C. § 102(a).

EP '043 claims a three-piece solid golf ball that has a solid core, an intermediate layer and an outer cover layer, just like the golf ball disclosed in the '707 patent. The ball has an intermediate layer which is hard relative to the cover and the core. *See* [0010]. The purpose of the invention is to provide good flight performance, control, feel, and durability. *See* [0009].

The EP 043 patent teaches a core which is formed from a "well known rubber composition." *See* [0017]. Just like the '707 patent, the EP 043 patent provides the core recipe, core diameter, curing time, and curing temperature. *See* Table 1; [0023]. The specification discusses a core hardness of 45 to 80 degrees. *See* [0011].

The EP 043 reference provides nine example balls, and provides detailed instruction as to their manufacture. These instructions include the core composition, curing time, and curing temperature. Table 2 of the EP 043 patent discloses the resulting measurements for the cover hardness, intermediate layer hardness, and core surface hardness of the example balls... Although the inventors did not disclose the core center hardness of the example balls, based upon the teachings of the specification, one of ordinary skill in the art can easily determine that value.

The engineers followed the directions in the EP '043 patent to make and measure the properties of the core. Because the EP '043 patent's instructions are just as detailed as those of

the '707 patent, one of ordinary skill should get a consistent core center hardness by following the instructions in the patent.[15] The engineers manufactured a core and measured the core center hardness at 50.2 degrees. The core had a surface hardness of 67.4 degrees, which is equivalent to the example hardness of 66 degrees in light of the repeatability of durometer measurements.[16]

**a. "wherein the core center hardness is up to 75 degrees"**

The center hardness of the core manufactured in accordance with the recipe and curing conditions disclosed in EP '043 was 50.2 degrees, which meets this limitation.

**b. "the core surface hardness is up to 85 degrees"**

In Example 2 of Table 2, the EP '043 patent discloses a core with a surface hardness of 66 degrees, which meets this limitation.

**c. "the core surface hardness us higher than the core hardness by 8 to 20 degrees"**

The hardness gradient of the core manufactured in accordance with the recipe and curing conditions disclosed in EP '043 was 17.2 degrees, which meets this limitation.

**d. "The intermediate layer hardness is higher than the core surface hardness by at least 5 degrees"**

Example 2 of Table 2 discloses a core with a surface hardness of 66 degrees and an intermediate layer hardness of 91 degrees. This yields a difference of 25 degrees, which is well within the claimed range.

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[15] That is, the variation in the results should be consistent with the measurement variation which I discussed above. In addition, since Acushnet owns English-unit molds, the tests used a 35.28 mm core mold in lieu of the 35.31 mm diameter specified in the patent. The difference between these diameters on core hardness is miniscule (0.09%).

[16] The relative repeatability of the Shore-D durometer measurement is 15.7%. *See* ASTM D-2240 (Ex. 42). The JIS-C test has a similar repeatability.

**e. "the cover hardness is lower than the intermediate layer hardness by at least 5 degrees"**

Table 2 shows that Example 2 has a cover hardness of 82 degrees. *See* Table 2. This is nine degrees lower than the intermediate layer hardness, and therefore meets this limitation.

**f. "the dimples occupy at least 62% of the ball surface"**

It would have been obvious to one of ordinary skill in the art in March of 1996 to use a dimple pattern of at least 62% when constructing Example 2 in Table 2. The EP '043 does not disclose the dimple coverage of the Example 2 ball. However, it evaluated the flying performance of the example balls, *see* [0027], and example 2 demonstrated good flying performance. *See* Table 2. One of ordinary skill in the golf ball art would recognize that, for a ball to have good flying performance, it would have to have dimples. Therefore, one of ordinary skill in the golf ball are would have looked to what was common in the golf ball art at the time the patentee filed the application that resulted in the EP '043 patent and use a comparable design.

Exhibit 48 is a summary of the percentage dimple coverage for a variety of golf balls from 1992 through 1994, and was generated from Acushnet's competitive test data. During that time period, I understand that Acushnet personnel routinely measured dimple characteristics of competitive golf balls using a profilometer device. Exhibit 48 lists percentage dimple coverage of numerous competitively tested balls, which have been calculated using the phantom sphere method described in the '707 specification. *See* Col. 5, l. 35 – col. 6, l. 15.

As Exhibit 48 shows, almost all of the competitive balls considered between 1992 and 1994 had dimple surface coverages well in excess of 62%. Dimple surface coverage has increased over time – so it would have been obvious to use at least surface coverage as was common at that time – not less. Consequentially, it would have been obvious to one of ordinary skill in the art to use a dimple pattern with at least 62% dimple coverage.

## IX. UNITED STATES PATENT NO. 5,803,834

The '834 Patent discloses a two-piece golf ball. The patent claims that the ball has an optimized hardness distribution in the core and a desirable hardness difference between the core and the cover. Col. 2, ll. 22-23. Claim 1, the only claim asserted, reads:

> A two-piece solid golf ball comprising a solid core and a cover enclosing the core and having a number of dimples in its surface, wherein
>
> said solid core has such a distribution of hardness as measured by a JIS-C scale hardness meter that a surface hardness is up to 85 degrees, a center hardness is lower than the surface hardness by not less than 8 to less than 20 degrees, and a hardness within 5 mm inside the core surface is up to 8 degrees lower than the surface hardness,
>
> said cover has a hardness which is higher than the surface hardness of the core by 1 to 15 degrees and a gauge[17] of 1.5 to 1.95 mm, and
>
> the number of dimples is 360 to 450.

### A. The '834 Patent is Anticipated by Bridgestone's Precept EV Extra Spin Golf Ball

Claim 1 of the '834 patent is anticipated by Bridgestone's own Precept EV Extra Spin golf ball. It is my understanding that Bridgestone sold the two-piece, EV Extra Spin golf ball in the United States as early as 1994,[18] and that a reference is prior art if it was sold in the United States more than one year before Bridgestone filed the application that resulted in the '834 patent (February 27, 1997). Therefore, it is my understanding that the EV Extra Spin is prior art.

I created a protocol for testing of prior art golf balls. Following my direction, engineers performed tests on six EV Extra Spin golf balls that Acushnet acquired in 1996. These tests were performed on equipment that I personally inspected, and it is my opinion that the tests were done properly. The tests results showed the EV Extra Spin golf ball to have the properties

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[17] As used in the '834 patent, the term gauge is equivalent to the term thickness.

[18] *See* AB 4601.

specified in the '834 patent. I have reproduced the raw data obtained by these tests below, as well as table containing my analysis of this data.

**1996 PRECEPT EV EXTRA SPIN MEASURED VALUES**[19]

| Sample No. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Cover Thickness, in | 0.073 | 0.072 | 0.074 | 0.072 | 0.072 | 0.072 |
| | | | | | | |
| Cover Hardness, JIS-C | 86.8 | 86.2 | 87.0 | 87.1 | 87.1 | 86.6 |
| | 86.5 | 87.0 | 87.4 | 87.0 | 86.5 | 86.7 |
| | | | | | | |
| Core Surface Hardness, JIS-C | 79.9 | 80 | 81.1 | 80.4 | 80.6 | 80.4 |
| | 80 | 80.4 | 80.1 | 78.1 | 80.1 | 80.2 |
| | | | | | | |
| Core Center Hardness | 66.8 | 64.8 | 70.7 | 70.9 | 66.0 | 67.3 |
| | | | | | | |
| Hardness at 5mm | 77.7 | 77.7 | 76.5 | 74.5 | 77.7 | 76.3 |
| | 78.6 | 76.9 | 77.6 | 76.7 | 77.0 | 76.5 |
| | 76.7 | 77.3 | 77.9 | 75.2 | 76.8 | 77.3 |
| | 78.1 | 77.3 | 77.0 | 75.9 | 76.7 | 77.6 |

**1996 PRECEPT EV EXTRA SPIN COMPARISON TO '834 PATENT**

| Sample No. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Said solid core has such a distribution of hardness as measured by a JIS-C scale hardness meter that a surface hardness is up to 85 degrees, | 80.0 | 80.2 | 80.6 | 79.3 | 80.4 | 80.3 |
| a center hardness is lower than the surface hardness by not less than 8 to less than 20 degrees, | 13.2 | 15.4 | 9.9 | 8.3 | 14.4 | 13.0 |

19 This table shows the raw test data. Cover thickness was found by taking the difference in average diameter, measured at the pole and two equator locations for each golf ball, before and after the cover is removed. The results of two cover hardness measurements, measured once at each pole, are shown here. The results of two core surface hardness measurements, again taken once at each pole, are also shown. Core center hardness was measured once, at the core center. The hardness at 5mm was measured at four discrete points, each of which was 5mm from the core surface. When more than one measurement was taken, the average values are used in the calculations below. (*See* Ex. 24.)

| Sample No. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **And a hardness within 5 mm inside the core surface is up to 8 degrees lower than the surface hardness,** | 2.2 | 2.9 | 3.3 | 3.7 | 3.3 | 3.4 |
| **Said cover has a hardness which is higher than the surface hardness of the core by 1 to 15 degrees** | 6.7 | 6.4 | 6.6 | 7.8 | 6.5 | 6.3 |
| **and a gage of 1.5 to 1.95 mm, and** | 1.85 | 1.83 | 1.88 | 1.83 | 1.83 | 1.83 |
| **the number of dimples is 360 to 450.** | 392 | 392 | 392 | 392 | 392 | 392 |

My opinion, based on the results of these tests, is that the EV Extra Spin golf ball includes each and every limitation of claim 1 of the '834 patent, as follows:

- All balls had a core surface hardness of less than 85 degrees.
- The difference between the center hardness and the surface hardness for all balls was between 8.3 to 15.4 degrees.
- The hardness within 5 mm inside the core surface for all balls was up to 8 degrees lower than the surface hardness.
- The cover hardness was 6.3 to 7.8 degrees higher than the surface hardness of the core.
- The gauge was between 1.83 mm and 1.88 mm
- All the balls had 392 dimples.

It is my opinion that these tests accurately reflect the properties of the golf balls when they were sold. Like the Altus Newing Massy ball, the Precept EV Extra Spin is encased in an ionomer resin cover.[20] Such a cover would protect the core from the possible negative affects of moisture and oxygen permeation. Furthermore, the measurements obtained by my tests correspond with my understanding of the Precept EV Extra Spin's properties as it was originally

[20] *See* AB 0044600

manufactured. For example, the Titleist and Foot Joy Competitive Ball Report, AB 0044585-622, shows the Precept EV Extra Spin as having a core center hardness of 67 degrees, and a core surface hardness of 79 degrees. These values correspond with the hardnesses reported in the table above. The average core surface hardness listed above is 80.1 degrees. The average core center hardness is 67.8 degrees.

As Bridgestone's EV Extra Spin meets all the limitations of the '834 patent, the golf ball anticipates the patent. Therefore, it is my opinion that the '834 patent is invalid.

### B. The '834 Patent is Anticipated by the 1993 Wilson Ultra Competition Golf Ball

Claim 1 of the '834 patent is anticipated by the 1993 Wilson Ultra Competition golf ball as well. I understand that Wilson sold the two-piece Ultra Competition in the United States beginning in 1993. As Wilson sold this ball in the United States more than one year before Bridgestone filed the application that resulted in the '834 patent (February 27, 1997), it is my further understanding that the Wilson Ultra is prior art against the '834 patent.

I used the same testing protocol described above to have 1993 Wilson Ultra Competition prior art balls tested. I have reproduced below the data obtained by these tests for several balls that fell within the scope of the claims.

**1993 WILSON ULTRA COMPETITION MEASURED VALUES**[21]

| | 1 | 2 | 5 | 6 |
|---|---|---|---|---|
| **Cover Thickness** | 0.073 | 0.072 | 0.071 | 0.073 |
| | | | | |
| **Cover Hardness** | 87.9 | 88.7 | 88.4 | 87.6 |
| | 88.1 | 88.1 | 88.6 | 87.1 |
| | | | | |
| **Core Surface Hardness** | 80.4 | 79.6 | 80 | 80.3 |
| | 80.2 | 79.8 | 80.5 | 80.1 |
| | | | | |
| **Core Center Hardness** | 66.3 | 68.4 | 69.7 | 65.4 |

21 *See* Ex. 49.

| | | | | |
|---|---|---|---|---|
| | | | | |
| **Hardness at 5mm** | 74.5 | 74.7 | 74.7 | 75.4 |
| | 72.8 | 74.2 | 75.9 | 74.2 |
| | 74.7 | 73.9 | 76.2 | 75.1 |
| | 73 | 72.5 | 74.1 | 72.4 |

**1993 WILSON ULTRA COMPETITION COMPARISON TO '834 PATENT**

| | 1 | 2 | 5 | 6 |
|---|---|---|---|---|
| **said solid core has such a distribution of hardness as measured by a JIS-C scale hardness meter that a surface hardness is up to 85 degrees,** | 80.3 | 79.7 | 80.3 | 80.2 |
| **A center hardness is lower than the surface hardness by not less than 8 to less than 20 degrees,** | 14.0 | 11.3 | 10.6 | 14.8 |
| **and a hardness within 5 mm inside the core surface is up to 8 degrees lower than the surface hardness,** | 6.6 | 5.9 | 5.0 | 5.9 |
| **said cover has a hardness which is higher than the surface hardness of the core by 1 to 15 degrees** | 7.7 | 8.7 | 8.3 | 7.2 |
| **and a gage of 1.5 to 1.95 mm, and** | 1.85 | 1.83 | 1.80 | 1.85 |
| **the number of dimples is 360 to 450.** | 432 | 432 | 432 | 432 |

My opinion, based on the results of these tests, is that the Wilson Ultra Competition golf balls above include each and every limitation of claim 1 of the '834 patent, as follows:

- All balls had a core surface hardness of less than 85 degrees.
- The difference between the center hardness and the surface hardness for all balls was between 10.6 and 14.8 degrees.
- The hardness within 5 mm inside the core surface for all balls was up to 8 degrees lower than the surface hardness.

- The cover hardness was 7.2 to 8.7 degrees higher than the surface hardness of the core.
- The gauge was between 1.80 mm and 1.85 mm
- All the balls had 432 dimples.

As with the other balls discussed above, the Wilson Ultra Competition ball has an ionomer cover.[22] As already discussed, ionomeric covers serve as moisture and oxygen barriers, and protect the core from degradation. Moreover, my measurements correspond with my understanding of the Wilson Ultra Competition's properties as it was originally manufactured. For example the Titleist and Foot Joy Competitive Ball Report, AB 0044585-622, shows the Wilson Ultra Competition as having a core center hardness of 67 degrees, and a core surface hardness of 79 degrees. These values correspond with the hardness reported in the table above. The average core surface hardness listed above is 80.1 degrees. The average core center hardness is 67.5 degrees.[23]

As the above Wilson's Ultra Competition balls meet all the limitations of the '834 patent, the golf ball anticipates the patent. Therefore, it is my opinion that the '834 patent is invalid.

## X. UNITED STATES PATENT NO. 6,679,791

The '791 patent is directed to a multi-piece golf ball. This patent asserts that the disclosed golf ball has improved flight distance, controllability, and feel. *See* Ex. 27, Abstract. The only difference between the '791 patent and the '707 patent, however, is that the '791 patent claims a hardness gradient of 22 and above.

Bridgestone is asserting Claims 11, 13, 16, and 26. Claim 11 depends from claim 1 and claim 26 depends from claim 24. Therefore, I have reviewed the validity of claims 1, 11, 13, 16, 24 and 26. Claim 1 of the '791 patent reads:

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[22] *See* AB 0044600.

[23] My opinion is also supported by data from Acushnet's competitive testing performed in 1993 when the balls were first examined. *See* AB 0004466-67. The average test value for core surface hardness in 1993 was 79 degrees and the average core center hardness was 67 degrees, which are comparable with the recently measured values.

A golf ball comprising a rubbery elastic core having a center and a radially outer surface, a cover having a plurality of dimples on the surface thereof, and at least one intermediate layer situated between the core and the cover; wherein said intermediate layer is composed of a resin material which is harder than the cover and has a greater hardness than the surface of the elastic core when compared using the same hardness scale, and said elastic core has a hardness which gradually increases radially outward from the center to the surface thereof, and a difference in JIS-C hardness of at least 22 between the center and the surface.

Claim 11 of the '791 patent reads:

The golf ball of claim 1, wherein said elastic core is formed of rubber as the base material comprising an ingredient selected from a group consisting of pentachlorothiophenol, pentafluorothiophenol, pentabromothiophenol, p-chlorothiophenol and the zinc salt of pentachlorothiophenol.

Claim 13 of the '791 patent reads:

A golf ball comprising a rubbery elastic core having a center and a radially outer surface, a cover having a plurality of dimples on the surface thereof, and at least one intermediate layer situated between the core and the cover; wherein said intermediate layer is composed of a resin material which is harder than the cover, and has a greater hardness than the surface of the elastic core when compared using the same JIS-C hardness scale, and said elastic core has a hardness at the center and a hardness at the surface thereof which is greater than the hardness at the center thereof, and a difference in JIS-C hardness of at least 22 between the center and the surface.

Claim 16 of the '791 patent reads:

The golf ball of claim 13, wherein the intermediate layer has a Shore D hardness of 50 to 67.

Claim 24 of the '791 patent reads:

A golf ball comprising a rubbery elastic core having a center and a radially outer surface, a cover having a plurality of dimples on the surface thereof, and at least one intermediate layer situated between the core and the cover; wherein said intermediate layer is composed of a resin material which is harder than the cover having a Shore D hardness of 45 to 58 and has a greater hardness than the surface of the elastic core when compared using the same hardness scale, and said elastic core has a hardness at the center and a hardness at the surface thereof which is greater than the hardness at the center thereof, and a difference in JIS-C hardness of at least 22 between the center and the surface.

Claim 26 of the '791 patent reads:

> The golf ball of claim 24, wherein said elastic core is formed of rubber as the base material comprising an ingredient selected from a group consisting of pentachlorothiophenol, pentafluorothiophenol, pentabromothiophenol, p-chlorothiophenol and the zinc salt of pentachlorothiophenol.

### A. *Markman* Proceedings Related to the '791 Patent

I understand that one of the terms in the asserted claims of the '791 patent is at issue in *Markman* proceedings before the Court. Specifically, the parties dispute the meaning of "gradually increases." Acushnet contends that "gradually increases" means having a shape which is neither steep nor abrupt." (Acushnet Opening *Markman* Brief, CC). Bridgestone asserts "gradually increases" should be given its plain meaning. (Bridgestone Opening *Markman* Brief, DD). Under either of these current constructions, it is my opinion that the '791 is invalid.

### B. The '791 Patent is Anticipated by United States Patent No. 5,779,563

As set forth below, I have analyzed the claims of the '791 patent and conclude that each of claims 1, 11, 13, 16, 24 and 26 of the '791 patent are anticipated by United States Patent No. 5,779,563 (the '563 Patent) (Ex. 50). The PTO issued the'563 Patent to Bridgestone in 1998. The named inventors are Hisashi Yamagishi, Tasushi Ichikawa, and Atsushu Nakamura. Yamagishi was also an inventor on the '707 and '834 patents. The '563 patent was published more than a year before the '791 patent's foreign priority date, and, therefore, is prior art.

The '563 Patent discloses a three piece dimpled golf ball with improved flight distance, controllability, roll, and straight travel upon putting. *See* Abstract. The '563 patent teaches a multi-layer ball with a cover, intermediate layer, and core. *See* Abstract.

#### 1. Claim 1 of the '791 patent

The preamble to claim 1 of the '791 patent states that it relates to a "golf ball comprising a rubbery elastic core having a center, and a radially outer surface, a cover having a plurality of dimples..., and a least one intermediate layer between the core and the cover." The '563 patent also relates to the manufacture of such a golf ball. The '563 golf ball discloses a multi-piece

solid golf ball comprising "a solid core and a cover of at least two layers enclosing the core and having a number of dimples…The solid core is made of a rubber base… ('563 patent, *Abstract*.)

Claim 1 requires that the intermediate layer is composed of a resin material which is harder than the cover and has a greater hardness than the surface of the elastic core when compared using the same hardness scale. The '563 patent discloses the core, cover and intermediate layer properties in Table 4:

TABLE 4

| | | E1 | E2 | E3 | E4 | CE1 | CE2 | CE3 |
|---|---|---|---|---|---|---|---|---|
| Core | Weight | 25.44 | 29.02 | 26.19 | 27.10 | 33.53 | 25.44 | 14.69 |
| | Diameter | 35.50 | 37.00 | 36.00 | 36.00 | 38.70 | 35.50 | 27.70 |
| | Distortion under 100 kg load | 2.20 | 2.20 | 2.60 | 3.30 | 2.50 | 2.20 | 4.00 |
| | Volume | 23.43 | 26.52 | 24.43 | 24.43 | 30.35 | 23.43 | 11.13 |
| | Specific gravity | 1.086 | 1.094 | 1.072 | 1.109 | 1.105 | 1.086 | 1.320 |
| Inner cover | Type *5 | a | a | a | b | — | a | a |
| | Weight (g) | 33.20 | 35.90 | 32.84 | 32.84 | — | 33.20 | 34.52 |
| | Diameter (mm) | 38.75 | 39.70 | 38.75 | 38.75 | — | 38.75 | 38.30 |
| | Volume | 7.04 | 6.24 | 6.04 | 6.04 | — | 7.04 | 18.29 |
| | Specific gravity (calcd.) | 1.102 | 1.102 | 1.102 | 0.950 | — | 1.102 | 1.102 |
| | Net weight | 7.76 | 6.88 | 6.65 | 5.74 | — | 7.76 | 20.15 |
| | Gage | 1.63 | 1.35 | 1.38 | 1.38 | — | 1.63 | 5.30 |

TABLE 4-continued

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Outer cover | Type | A | A | B | B | C | A | D |
| | Volume | 10.30 | 8.00 | 10.30 | 10.30 | 10.42 | 10.30 | 11.35 |
| | Net weight (g) | 12.10 | 9.40 | 12.46 | 12.46 | 11.77 | 12.10 | 10.78 |
| | Specific gravity | 1.175 | 1.175 | 1.210 | 1.210 | 1.130 | 1.175 | 0.950 |
| | Gage (mm) | 1.98 | 1.50 | 1.98 | 1.98 | 2.00 | 1.98 | 2.10 |
| | Shore D hardness | 45 | 45 | 53 | 53 | 55 | 45 | 65 |
| Ball | Weight (g) | 45.30 | 45.30 | 45.30 | 45.30 | 45.30 | 45.30 | 45.30 |
| | Diameter (mm) | 42.70 | 42.70 | 42.70 | 42.70 | 42.70 | 42.70 | 42.70 |
| Inertia moment | | 85.2 | 85.0 | 85.8 | 84.8 | 84.5 | 85.2 | 80.6 |
| | $M_{UL}$ | 88.4 | 88.4 | 89.0 | 89.0 | 89.2 | 88.4 | 90.0 |
| | $M_{DL}$ | 81.4 | 81.4 | 82.0 | 82.0 | 82.2 | 81.4 | 83.0 |
| Dimple type | | I | II | I | II | I | III | I |
| Flying distance @HS40 | Carry (m) | 184.5 | 185.2 | 185.7 | 185.5 | 180.3 | 177.0 | 183.0 |
| | Total (m) | 198.6 | 199.0 | 200.0 | 200.5 | 195.7 | 191.5 | 197.5 |
| Scrape resistance | | ○ | ○ | ○ | ○ | X | ○ | ○ |
| Continuous durability | | ○ | ○ | ○ | ○ | Δ | ○ | Δ |
| Feeling | | ○ | ○ | ○ | ○ | Δ | ○ | ○ |

| *5 Inner cover type | a | b |
|---|---|---|
| HYTREL 4047 | 100 | |
| HIMILAN 1706 | | 50 |
| HIMILAN 1605 | | 50 |

Table 4 only specifically discloses the hardness of the outer cover. The Shore D cover hardness of the golf ball in Example 4 is 53.

The hardness of the inner cover and the core, however, are inherent in the patent specification. Table 4, footnote 5, of the '563 patent shows that Example 4 ("E4") has a type "b"

inner cover.[24] A cover type "b" inner cover is a blend of 50 parts Himilan 1706 and 50 parts Himilan 1605. This particular blend of Himilan 1706 and 1605 is common in the prior art, and its properties are well-known. Himilan is an ionomer resin. Therefore, just like the '791 golf ball, the '563 ball has an intermediate layer made of resin.

Also, Bridgestone's '852 patent, published in 1996, shows that this Himilan blend has a JIS-C hardness of 91 degrees. One of ordinary skill in the art knows that it is possible to convert Shore D hardness measurements to the JIC-S scale using a conversion formula. The formula is an approximation based upon experimental tests. DuPont has published one such formula (*See* Ex. 8):

Shore D = (0.76 • JIS C) - 8[25]

U.S. Patent No. 5,645,496, issued in 1997, shows that this Himilan blend has a Shore D hardness of 62. A Shore D hardness of 62 corresponds to a JIS-C hardness of 92 degrees. Bridgestone's U.S. patent No. 6,267,694, shows that the blend has a Shore D hardness of 62 degrees. Therefore, one of ordinary skill in the art would understand that a blend of Himilan 1706 and 1605 has a JIS-C hardness of 91-92 degrees and a Shore D hardness of 62.

As the intermediate layer, with a Shore D hardness of 62 degrees, is harder than the cover, the '563 also meets this limitation of claim 1 of the '791 patent.

Although the '563 does not disclose the hardness of the cores, the '563 patent gives the recipe for each example core. *See* Col 7, l. 45- Col. 8, l. 10. Table 1. The curing time (18 minutes) and temperature (160°) is also provided in the specification. *See* Col, 6, l. 50. Therefore, I had the cores of Example 4 of the '563 patent reproduced in accordance with the

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[24] One of ordinary skill in the art would understand that the "inner cover" of the '563 patent is the same feature identified as the "intermediate layer" in the '791 patent. Both patents disclose a multi-piece solid golf ball. The Figure 1 in both patents are almost identical and the brief description of the drawings in the '563 and '791 patent identify the same middle layer when referring to the "inner layer" and "intermediate layer," respectively.

[25] I recognize that other conversion formulas are also used in the golf ball art. Bridgestone's own documents list three other conversion formulae: (1) Shore D = (0.886 • JIS C) – 16.31; (2) Shore D = (0.7637 • JIS C) – 8.2925; and (3) Shore D = (0.7982 • JIS C) – 10.28. (*See* Ex. 51.)

recipe and curing time and temperature given in the '563 patent The resulting core hardness measurements were as follows:[26]

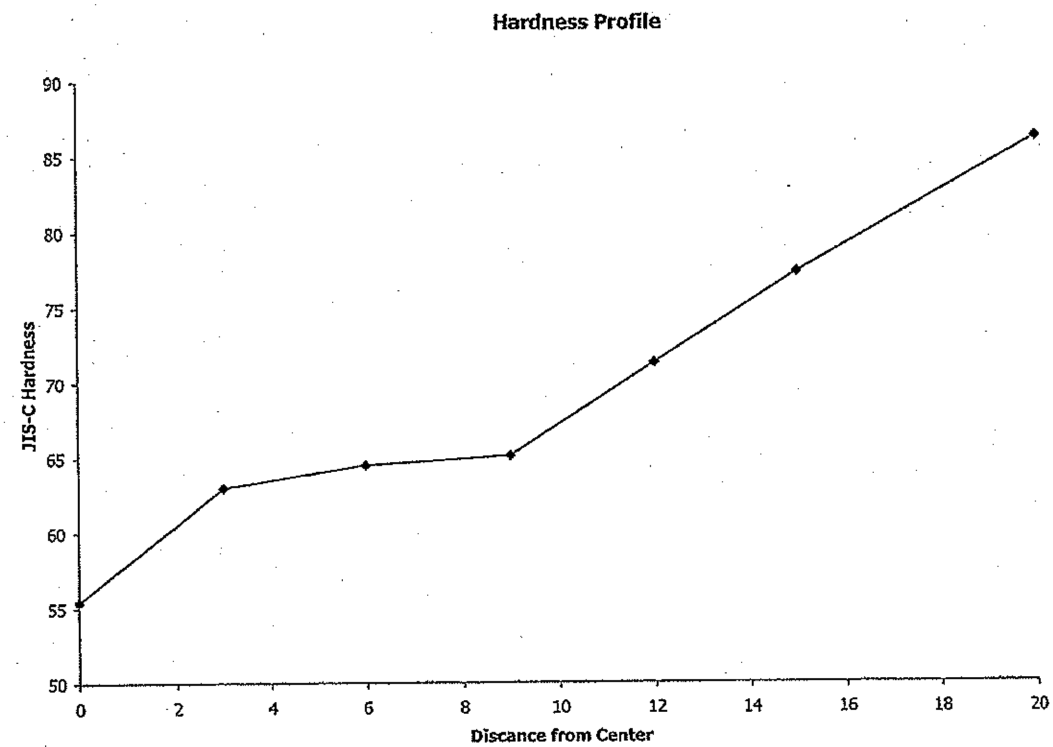
| Sample | Core Surface Hardness, JIS-C | Core Center Hardness, JIS-C | Hardness Gradient, JIS-C |
|---|---|---|---|
| 1 | 86.2 | 55.4 | 30.8 |
| 2 | 86.1 | 57.5 | 28.6 |
| 3 | 86.0 | 57.2 | 28.8 |
| 4 | 86.2 | 58.0 | 28.2 |
| 5 | 85.9 | 59.4 | 26.5 |
| 6 | 86.4 | 60.5 | 25.9 |

All six cores had a surface hardness less than 87 degrees JIS-C. The intermediate layer has a hardness of 91 degrees. Therefore, the intermediate layer has a greater hardness than the surface of the core just like the intermediate layer in claim 1 of the '791 patent.

Claim 1 of the '791 patent also requires that the elastic core have a hardness which gradually increases radially outward from the center to the surface of the core." In order to determine whether the '563 met this limitation, I generated a core hardness profile for one of the sample cores made according to the recipe in the '563 patent, as follows:[27]

[26] *See* Ex. 52.

[27] *See* Ex. 53.




As I stated above, regardless of which parties definition of "gradually increases" I use, it is my opinion that the plot of the hardness profile above does gradually increase. In fact, one of ordinary skill in the art would expect that a one-piece core manufactured in accordance with the instructions (recipe and curing time and temperature) of the '563 patent would gradually increase in hardness, or in other words, not have an steep or abrupt changes in hardness. Therefore, the '563 patent meets this limitation of claim 1.

Finally, claim 1 also requires that the elastic core have a "difference in JIS-C hardness of at least 22 between the center and the surface."

All six sample cores had a hardness gradient of between 25 and 31 degrees JIS-C. Therefore, the '563 patent discloses each and every limitation of claim 1, and thus, anticipates claim 1 of the '791 patent.

### 2. Claim 11 of the '791 patent

Claim 11 of the '791 patent depends from claim 1 and further requires that the "elastic core is formed of a rubber as the base material comprising an ingredient selected from a group consisting of pentachlorothiophenol, pentafluorothiophenol, pentabromothiophenol, p-chlorothiophenol and the zinc salt of pentachlorothiophenol."

Table 1 of the '563 Patent shows that Example 4 of the '563 patent contains 0.2 pph weight of zinc pentachlorothiophenol. Therefore, the '563 patent discloses each and every limitation of claim 11; and thus, anticipates claim 11 of the '791 patent.

### 3. Claim 13 of the '791 Patent

Claim 13 of the '791 patent is an independent claim. Claim 13, however, substantively has all the limitations of claim 1, but requires that the "intermediate layer is composed of a resin material which is harder than the cover and has a greater hardness than the surface of the elastic core when compared using the same JIS-C hardness scale."

Returning to Table 4 of the '563 patent, it shows that the cover hardness of Example 4 is 53 degrees Shore D. Using the equation that converts Shore D hardness to JIS-C hardness, a 53 Shore D hardness equals 80.3 degrees JIS-C.[28]

Since the blend of Himilan resins used in Example 4 is known to have a JIS-C hardness of 91 degrees, the intermediate layer is harder than the cover of Example 4 using the JIS-C hardness scale. Therefore, the '563 patent discloses each and every limitation of claim 13; and thus, anticipates claim 13 of the '791 patent.

### 4. Claim 16 of the '791 Patent

Claim 16 of the '791 patent depends from Claim 13 and further requires that the intermediate layer has a Shore D hardness of 50 to 67. The intermediate layer disclosed in Example 4 of the '563 patent is made of the Himilan 1605 and 1706 blend has a Shore-D hardness of 62 degrees, which is within the claimed range of the '791 patent. Therefore, the '563

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[28] Using Bridgestone's conversion formulae, the JIS-C hardness is calculated to be 78.2, 80.3, and 79.3, respectively. The claim limitation is met regardless of which of the values I use.

patent discloses each and every limitation of claim 16; and thus, anticipates claim 16 of the '791 patent.

### 5. Claim 24 of the '791 Patent

Claim 24 of the '791 patent is an independent claim. Claim 24, however, also is substantively the same as claim 1, but requires that the intermediate layer is harder than the cover "having a Shore D hardness of 45 to 58."

The cover hardness of Example 4 of the '563 patent 53 degrees Shore D. Since the intermediate layer, with a Shore D hardness of 62 degrees, is harder than the cover, the '563 meets this limitation of claim 24 of the '791 patent, as well as the others. Therefore, the '563 patent anticipates claim 24 of the '791 patent.

### 6. Claim 26 of the '791 Patent

Claim 26 of the '791 patent depends from Claim 24 and further requires that the "elastic core is formed of a rubber as the base material comprising an ingredient selected from a group consisting of pentachlorothiophenol, pentafluorothiophenol, pentabromothiophenol, p-chlorothiophenol and the zinc salt of pentachlorothiophenol."

Table 1 of the '563 Patent shows that Example 4 of the '563 patent contains 0.2 pph weight of zinc pentachlorothiophenol. Therefore, the '563 patent discloses each and every limitation of claim 26; and thus, anticipates claim 26 of the '791 patent

## C. United States Patent No. 6,174,247 Renders the '791 Patent Obvious

I understand that even if a claim is not anticipated by the prior art, the claim may still be rendered invalid if it is obvious in light of the prior art. When determining obviousness, more than one reference may be combined to invalidate the claim in question. When combining references, I understand that a motivation to combine the references must exist in the references themselves, or in light of the experience of one of ordinary skill in the art

I have analyzed the claims of the '791 patent and conclude that each of claims 1, 11, 13, 16, 24 and 26 of the '791 patent are rendered obvious by United States Patent No. 6,174,247 (the

'247 Patent) (Ex. 54). The PTO issued the '247 Patent to Bridgestone in 2001. It claims priority to a Japanese application dated August 8, 1997. and was filed August 10, 1998. As the '247 patent application was filed more than one year before either the foreign filing date or the U.S. filing date of the '791 patent, I understand that it is prior art. The named inventors are Hiroshi Higuchi, Yasushi Ichikawa, Hisashi Yamagishi, and Junji Hayashi. Yamagishi is also a named inventor on the '707 and '834 patents.

The '247 patent relates to a multi-piece solid golf ball comprising a solid core enclosed with a cover of two inner and outer layers. The '247 patent discloses that the core is formed relatively soft, the inner cover layer is formed mainly of an ionomer resin and has a Shore D hardness of 28 to 58, and the outer cover layer has a Shore D hardness of 28 to 55. *See* Col. 1, ll. 31-39. The '247 patent asserts, as does the '791 patent and 563, that the disclosed ball results in increased flight distance, superior control and better feel. *See* Col. 4, ll. 52-54.

Again, just like the '563 and '791, the '247 patent, in Table 5, discloses the core, cover and intermediate layer properties in Table 4:

TABLE 5

| | Comparative Example | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Core | | | | | | |
| Weight (g) | 25.83 | 30.25 | 27.47 | 29.72 | 30.76 | 29.16 |
| Diameter (mm) | 35.50 | 36.40 | 35.30 | 36.50 | 36.50 | 36.50 |
| Distortion @ 100 kg (mm) | 2.20 | 3.00 | 4.00 | 2.90 | 2.90 | 3.20 |
| Specific gravity | 1.103 | 1.198 | 1.193 | 1.167 | 1.208 | 1.145 |
| Inner cover layer | | | | | | |
| Type | e | f | e | e | g | h |
| Shore D hardness | 40 | 42 | 40 | 40 | 56 | 62 |
| Specific gravity | 1.12 | 1.01 | 1.12 | 1.12 | 0.98 | 0.98 |

TABLE 5-continued

| | Comparative Example | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Gage (mm) | 1.63 | 1.80 | 1.70 | 1.60 | 1.60 | 1.60 |
| Outer cover layer | | | | | | |
| Type | A | D | E | F | G | A |
| Specific gravity | 1.183 | 0.980 | 0.980 | 0.980 | 0.980 | 1.183 |
| Gage (mm) | 1.98 | 1.35 | 2.00 | 1.50 | 1.50 | 1.50 |
| Shore D hardness | 50 | 45 | 62 | 53 | 58 | 50 |
| Ball | | | | | | |
| Weight (g) | 45.30 | 45.30 | 45.30 | 45.30 | 45.30 | 45.30 |
| Diameter (mm) | 42.70 | 42.70 | 42.70 | 42.70 | 42.70 | 42.70 |
| Inertia moment (g-cm$^2$) | 84.6 | 81.2 | 81.3 | 82.1 | 80.9 | 83.4 |
| #W1/HS45 | | | | | | |
| Carry (m) | 208.1 | 205.3 | 207.9 | 205.8 | 207.9 | 208.1 |
| Total (m) | 217.2 | 217.5 | 221.0 | 218.1 | 219.2 | 220.3 |
| Spin (rpm) | 3075 | 3001 | 2548 | 2898 | 2689 | 2734 |
| Feeling | X | | O | | O | O |
| #SW/HS20 approach spin (rpm) | 6251 | 6236 | 4923 | 6211 | 5632 | 6132 |
| #PT feeling | O | ΔO | X | ΔO | X | X |
| Scraping resistance | O | Δ | O | Δ | Δ | X |
| Consecutive durability | O | O | X | O | O | X |

Table 5 specifically discloses the hardness of the outer cover and the inner cover. The Shore D outer cover hardness of the golf ball in Example 6 is 50. The Shore D inner cover hardness of Example 6 is 62. Since the inner cover is harder than the outer cover, this limitation of claim 1 is met.

Although the '247 patent does not disclose the specific hardness of the cores made according to its teachings, the '247 patent does provide the recipe used to make each exemplary

core. *See* Col. 5, Table 1. The '247 patent also discloses a curing temperature range (130-170°C). *See* Col. 3, l. 5. This curing temperature range covers temperatures commonly used in the golf ball art.

It is within the range of ordinary skill in the art to modify a core formulation recipe and/or to adjust the curing conditions in order to optimize core properties such as compression. For example, the core recipe and curing conditions are changed in factories between the summer and the winter or between two production lines making the same ball so as to achieve consistent core properties. .

Curing times of between 10 and 60 minutes and curing temperatures of between 120 and 190°C are common in golf ball manufacturing. The selection of curing conditions within this range for a particular ball is the choice of one of ordinary skill in the art, depending on the desired features of a particular golf ball.

I had cores made using the recipe of Comparative Example 6 of the '253 patent. Although the '247 patent does not specify the precise curing temperature and time, it would be obvious to one skilled in the art would know the basic parameters for selecting the conditions that would produce a core with a hardness gradient of 22 or more. It would involve only the application of routine skill in the art to select the right time and temperature from the well-known parameters.

For example, one set of conditions used to make cores at Acushnet in high volumes involves selecting a curing time and curing temperature of 11 minutes and 335°F, respectively. Using this time and temperature, and otherwise following the teachings of the 247 patent, I had cores made that resulted in core hardness gradients of well over 22. The use of this common curing time and curing temperature in conjunction with the teachings of the '247 patent yielded a golf ball which satisfies claims 11, 13, 16, and 26 of the '791 patent.

The hardness of the cores in Example 6 is shown below:[29]

[29] *See* Ex. 52.

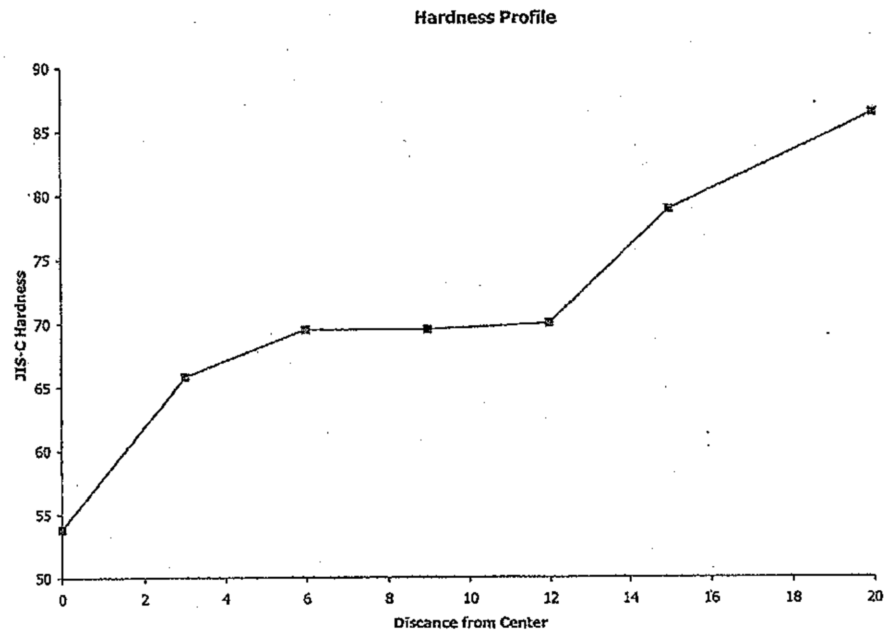
| Sample | Core Surface Hardness | Core Center Hardness | Core Gradient |
|---|---|---|---|
| 1 | 86.4 | 60.7 | 25.7 |
| 2 | 86.4 | 53.8 | 32.6 |
| 3 | 86.6 | 59.8 | 26.8 |
| 4 | 86.5 | 60.9 | 25.6 |
| 5 | 86.6 | 56.2 | 30.4 |
| 6 | 87.2 | 60.0 | 27.2 |

Comparative Example 6 has an intermediate layer with a Shore D hardness of 62. Using the DuPont conversion formula, this converts to a JIS-C hardness of 92 degrees.[30] The highest core surface hardness of sample cores was 87.2 degrees. Since the intermediate layer has a greater hardness than the surface of the core another limitation of claim 1 is met.

I had one of the sample cores measured to determine the core hardness profile generated by this curing process:[31]

[30] Using the alternative formulae, the JIS-C hardness is calculated to be 88, 92, and 91, respectively. The claim limitation is met regardless of which of these values I use.

[31] *See* Ex. 53.




The plot of the hardness profile above gradually increases. In fact, one of ordinary skill in the art would expect that a one-piece core manufactured in accordance with the instructions of the '247 and the knowledge of one skilled in the art would gradually increase in hardness, or in other words, not have any steep or abrupt changes in hardness. Therefore, the '247 patent meets this limitation of claim 1.

Finally, claim 1 also requires that the elastic core have a "difference in JIS-C hardness of at least 22 between the center and the surface." All of the sample cores had a hardness gradient between 25.7 and 32.6 degrees JIS-C, which is well above 22 degrees.

Table 1 of the '247 patent gives the formulations for each of the example cores. As can be seen, all example balls make use of 1 phw of the zinc salt of pentachlorothiophenol, which satisfies claim 11 of the '791 patent.

Table 5 of the '247 patent shows that the cover hardness of Comparative Example 6 is 62 degrees Shore D. This converts to 76 degrees JIS-C using the DuPont conversion.[32] The

[32] Using the Bridgestone conversion formulae, the JIS-C hardness is calculated to be 75, 76, and 76, respectively. The claim limitation is met regardless of which of these values I use.

intermediate layers in Comparative Example 6 have a Shore D hardness of 62, which converts to a JIS-C hardness of 92 degrees. Therefore, the intermediate layer is harder than the cover when compared using the JIS-C hardness scale.

Claim 16 of the '791 patent depends from Claim 13 and further requires that the intermediate layer has a Shore D hardness of 50 to 67. Table 4 of the '247 patent gives the Shore D hardness of all intermediate layers. As can be seen above, Comparative Example 6 possesses an intermediate layer of 62 degrees Shore D.

Claim 24 of the '791 patent is an independent claim. Claim 24, however, also is substantively the same as claim 1, but requires that the intermediate layer is harder than the cover "having a Shore D hardness of 45 to 58." Table 4 of the '247 patent lists the Shore D hardness of the example ball covers. Comparative Example 6 has a cover hardness of 50 degrees Shore D.

### D. The '791 Patent is Rendered Obvious In View of U.S. Patent No. 6,390,935

United States Patent No. 6,390,935 (Ex. 39) issued to Sumitomo Rubber Industries on May 21, 2002. Kazushige Sugimoto was the inventor. Its application was filed on October 7, 1999, which is before the Japanese priority date of the '791 patent. The purpose of the invention is to achieve good flight distance, controllability, and feel. Col. 2, ll. 10-14. It provides a multi-layered golf ball with special relationships between the hardness of different layers. In particular, it shows a "center," or core, with a difference in hardness between its center and surface of at least 8 degrees JIS-C. Col. 2, ll. 22 – 25.

The '935 patent provides a three-piece golf ball with a "center," "outer shell," and a "cover."[33] Col. 2, ll. 15 – 21. The center may have a hardness which is gradually increased from its center point to its surface. Col. 2, ll. 62-64. The center has a hardness at its surface which is

[33] One of ordinary skill in the golf ball art would recognize that the three piece structure shown in the '935 patent corresponds to the structure in the '791 patent. The center discussed in the '935 patent corresponds with the core discussed in the '791 patent. The outer shell discussed in the '935 patent corresponds with the intermediate layer claimed in the '791 patent.

higher than the hardness at its center point by 8 degrees, preferably by 10 degrees. Col. 3, ll. 3 – 8. The difference in hardness is preferably 25 degrees or smaller. Col. 3, ll. 22 – 24. Organic sulfide compounds may be used in the center. Col. 4, ll. 66 – 68. Dimples are formed into the ball's cover. Col. 8, ll. 42-43.

Each of claim 11, 13, 16, and 26 of the '791 patent is obvious by the combination of the '935 patent with the '563 patent and/or the '247 patent. Each reference is generally directed to the same problem of obtaining good flight distance and controllability. The '563 patent is directed to improving the flying distance, controllability, straight travel and roll of the golf ball. Col. 1, ll. 55-57. The '247 patent is directed toward improving flight distance, control, feel, and durability. Col. 2, ll. 11-16. The '935 patent is directed towards good flight distance, controllability, and feel. Col. 2, ll. 10-14. All three patents teach the use of three-piece golf balls.

The '935 patent teaches that having a hardness gradient less than 8 would result in having either a poor shot feeling, poor durability, or poor flight distance. Col. 3, ll. 3-22. The patent also teaches that a hardness gradient of up to 25 degrees is preferred. Col. 3, ll. 21-23. It would be obvious to use a core with this hardness gradient to obtain the shot feeling, durability, and flight distance desired in the '247 and '563 patents.

### E. The '791 Patent is neither Enabled nor Supported by the Written Description

The '791's specification shows that Bridgestone did not invent any technology embodied in the '791 patent which fulfills the entire range of the claim limitation, "[said elastic core] has a difference in JIS-C hardness of at least 22."

The maximum theoretical core hardness gradient is about 100 degrees.[34] However, technology that can create such a gradient is not known in the art. There are limits on what is

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[34] There is a theoretical upper limit of core hardness gradient. You would achieve this limit by curing the core in such a manner that the outer surface is completely vulcanized and is made as hard as possible, and the center is completely uncured. I can assume that the completely vulcanized rubber could be made to have nearly the

generally known to be achieved in curing a single piece of polybutadiene. Conventional techniques have an upper limit on the gradient that they can achieve.

The specification does not describe the use of any technology that would yield gradients in excess of 40 or 50 degrees. Golf ball cores can be *single layer*, or made from a single piece of polybutadiene, or *multilayer*, or made of two or more layers of polybutadiene. A multilayer core can have a larger core gradient, because a soft inner rubber can be wrapped inside a different, harder, outer rubber. The Pro V1x, which has a soft inner core surrounded by a hard outer core, is an example of a multi-layer ball. Because a single layer core is made of one material, however, its gradient can only be made through curing the core in a non-uniform manner. There is a limit to how soft the center can be kept while still curing the outer cover.

I agree with Mr. Shimosaka of Bridgestone that obtaining a gradient of over forty in a single layer core would require a new idea or technology which is not currently known in the golf ball art, and certainly was not disclosed in the specification of the '791 patent.

> Q. Now, if you wanted to create a single-layer core that had a very high gradient, let's say 40, that would involve a significant amount of experimentation to try to make that work, right? . . .
>
> ***A. Well, rather than any significant amount of experimentation I think that would require an innovative conception of idea or technology.***

11/16/2006 Deposition of Hirotaka Shimosaka 56:10 to 56:20

The specification of the '791 patent is directed towards single-core balls. It only discusses single cores – it never mentions the use of multiple core layers. The patent emphasizes the necessity of a "gradually increasing" hardness profile.[35] A multilayer core cannot have a gradually increasing hardness – its hardness takes a distinct jump between the softer inner core

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maximum hardness measurable on the JIS-C scale, 100 degrees, and that the uncured rubber would have nearly the minimum, zero degrees. Therefore, the maximum theoretical hardness gradient can never exceed 100 degrees.

[35] *See* Col. 2, ll. 6-9; col. 4, ll. 1-5. The only originally filed claim was directed towards cores with a gradually increasing hardness. *See* Originally Filed Specification at 15. Independent claims 13 and 24, which did not have this limitation, were added later by amendment. *See* August 15, 2002 Amendment.

and harder outer layer. Because the specification emphasizes the use of a gradually increasing hardness, it clearly does not address the use of multilayer cores like that in the Pro V1x.

The specification of the '791 patent does not teach the use of cores with gradients over 30. In fact, it teaches away from cores with gradients over 30. It teaches that the upper limit of the hardness difference is "at most 30, preferably 27 or less, and most preferably 25 units or less." Col. 3, ll. 43-45. Table 3 shows three Example cores and six Comparative Examples. *See* Table 3. All of these examples have gradients of 24 or less.

TABLE 3

| | | | | Example | | | Comparative Example | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 5 |
| Core | Composition (pbw) | 1,4-cis-Polybutadiene | | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | | Zinc diacrylate | | 41.0 | 38.0 | 35.0 | 28.0 | 27.8 | 38.0 | 32.1 | 28.4 |
| | | Peroxide (1)[1)] | | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| | | Peroxide (2)[2)] | | 0.8 | 0.8 | 0.8 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 |
| | | Sulfur[3)] | | 0.1 | 0.1 | 0.1 | 0 | 0 | 0.1 | 0.1 | 0.1 |
| | | Antioxidant[4)] | | 0 | 0 | 0 | 0.2 | 0.2 | 0 | 0 | 0 |
| | | Barium sulfate | | 24.1 | 25.2 | 26.4 | 29.8 | 29.9 | 25.2 | 12.8 | 14.4 |
| | | Zinc oxide | | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| | | Zinc salt of pentachlorothiophenol | | 1 | 1 | 1 | 0.2 | 0.2 | 1 | 1 | 1 |
| | Vulcanization conditions | Primary | Temperature (° C.) | 175 | 175 | 175 | 140 | 155 | 175 | 175 | 175 |
| | | | Time (min) | 15 | 15 | 15 | 30 | 15 | 15 | 15 | 15 |
| | | Secondary | Temperature (° C.) | — | — | — | 165 | — | — | — | — |
| | | | Time (min) | — | — | — | 15 | — | — | — | — |
| | Hardness | Surface (JIS-C hardness) | | 85 | 83 | 78 | 76 | 76 | 83 | 87 | 80 |
| | | Center (JIS-C hardness) | | 61 | 59 | 55 | 72 | 60 | 59 | 63 | 56 |
| | | JIS-C hardness difference | | 24 | 24 | 23 | 4 | 16 | 24 | 24 | 24 |
| | Deformation under loading (mm)[5)] | | | 3.4 | 3.8 | 4.1 | 3.3 | 3.4 | 3.8 | 3.4 | 4.1 |

The '791 patent is not enabled. It only teaches one how to use single core technology. That technology cannot create cores with gradients much over 40. This comes nowhere near the theoretical limit of what a core gradient can be.

Furthermore, the claims of the '791 patent are not supported by a written description which shows that Bridgestone actually possessed any technology which could create cores with a gradient significantly over 22. First, the patent does not give any example gradients over 25, and states that gradients over 30 are not preferred. Second, the patent only teaches the use of single-

layer cores, a technology that can only obtain gradients of up to around 40. There is nothing in the specification to indicate that Bridgestone was able to produce cores with a gradient over 40.

### F. No Secondary Considerations of Non-Obviousness Are Present

It is my understanding that a patent holder may rely on objective indicia of non-obviousness, known as secondary considerations, to try and preserve the validity of its patents. In forming my opinion regarding the asserted claims of the 852, '817, '707, '834 and '791 (the "Bridgestone patents"), I have considered whether any of these secondary considerations are present. I have reviewed Bridgestone's Ninth Supplemental Response to Acushnet's Interrogatory No. 10. In that response, Bridgestone generally contends that all of its asserted patents are non-obvious for the following reasons: (a) the alleged inventions led to unexpectedly better performance results; (b) Acushnet copied Bridgestone's technology; and (c) Acushnet's golf balls were commercially successful. In addition, Bridgestone specifically asserts that the '852, '707 and '791 patents are non-obvious because of Acushnet's failure to produce golf balls with 2 layer covers, that the '834 patent is non-obvious because of the claimed invention's commercial success and that the '852 and '707 patents are non-obvious because Bridgestone licensed those patents to Callaway.

It is my understanding that for objective indicia of non-obviousness to be significant there must be a connection or nexus between the claimed features of the invention and the particular secondary consideration. In its interrogatory response, Bridgestone did not describe or explain a connection between any objective indicia of non-obviousness and claimed inventions.

For example, Bridgestone does not explain how the commercial success of any Bridgestone or Acushnet golf ball was the result of a claimed feature of any Bridgestone patent.

It is my opinion that there can be no nexus between the asserted claims of the Bridgestone patents and the commercial success of Acushnet's current products if Acushnet does not infringe the asserted claim of any of these patents. This fact is also evidence that Acushnet could not have copied the asserted claims of the Bridgestone patents.

In addition, Bridgestone's Interrogatory response does not describe or explain how Acushnet's failure to produce golf balls with two-layer covers was related in any way to a failure to use the claimed features of the '852, '707 or '791 patents. Nor does Bridgestone describe any nexus between the performance of its golf balls and the claimed features of its patents.

Finally, I understand that Callaway licensed the '852 and '707 patents in connection with the settlement of a lawsuit with Bridgestone, but this license does not indicate to me that the claimed inventions were a commercial success. Bridgestone did not describe or explain that Callaway licensed those patents based on the claimed features of the '852 and '707 patents.

In the absence of any explanation of how the secondary considerations are related to the features of the Bridgestone patents, I cannot give Bridgestone's assertions any significant weight. With respect to the '791 patent, considering the minor differences between the patent and the teachings of the '563 and '247 patents, secondary considerations of obviousness (if any are even found to be present) are of minor significance in comparison to the evidence of obviousness. The fact that the '563 and '247 patents clearly possess all of the claimed features of the '791 patent when routine optimization is used to obtain core curing conditions is strong and overwhelming proof of obviousness even if some secondary indicia of obviousness exists.

Therefore, it is my conclusion that the asserted claims of the Bridgestone patents are obvious for the reasons set forth above.

## XI. CONCLUSION

I reserve the right to supplement this report should new information come to light that bears on my opinions contained in this report. I reserve the right to supplement or modify this report, if appropriate, to the extent that new or additional information is provided. I also reserve the right to consider and comment on additional evidence that may be presented by experts for Bridgestone.

At trial or any hearing in this litigation, I may provide demonstrative aids, such as computer animations, excerpts from relevant exhibits, deposition testimony, and physical examples, to assist in explaining the subject matter discussed in this report.

Signed this sixteenth day of January, 2007.

/s/ David Felker
David Felker, Ph.D.

# EXHIBIT B

## FULLY REDACTED

# EXHIBIT C

## FULLY REDACTED

# EXHIBIT D

2 of 2 DOCUMENTS


Golf Digest

February 1, 1999

**SECTION:** No. 2, Vol. 50; Pg. 70; ISSN: 0017-176X

**IAC-ACC-NO:** 54378692

**LENGTH:** 6993 words

**HEADLINE:** The COMING golf ball wars; golf industry

**BYLINE:** SEAL, MARK

**BODY:**

With four new manufacturers entering the fray, the competition and the hype for the most personal piece of golf equipment the ball-is certain to intensify. The insurgents are storming the gates and the longtime industry leaders are plotting to aggressively defend their turf. How will it all sort out-and what will it mean to you? We go inside the competing camps to find out.

Keep an eye on your golf ball: Forces are plotting to snatch it up and replace it with one of their own.

The blustering gods of contemporary golf equipment have come to wage an angry battle over the heart and soul of your game. It's a clash of wills and egos that golf has seldom seen. **Callaway** demands that you try its "pleasingly different" new ball; Taylor Made is doing its damnedest to dazzle you with its new ball's "revolutionary" feel; Nike seeks to seduce you with its Swoosh-all while the established market leaders, Titleist and Spalding, are screaming, "Get back to your game and they'll all go away!"

The Ball Wars have begun. This is no fantasy, but a scenario that will play out in shops, golf courses and in the media this year and next. It will be a war of Eastern tradition versus West Coast insurgency. In their attempt to make you switch or stay, the ball companies will be dispatching their foot soldiers, strafing your synapses with in-your- face ads and littering your clubhouses with marketing campaigns. Will you abandon your beloved, traditional brand-for which you've developed an attachment bordering on fanatical obsession-to try the new balls, or would you rather fight than switch?

"Ultimately, no matter what the brand loyalty is, if you build a better mousetrap, people will come," says Chuck Yash, president and CEO of

**Callaway** Golf Ball Company, one of the ball-business interlopers betting that you'll at least give their products a whirl.

You may be asking, "Why such sudden interest in balls?" The answer is, of course, money. Balls are golf's most lucrative commodity, with an estimated profit margin of 50 to 75 percent. They're also golf's only expend-able product, literally the food the game gobbles up in astonishing quantities. The annual U.S. retail market represents an estimated $ 650 million in sales, $ 1.5 billion worldwide-the biggest business sector in golf equipment, along with golf clubs. Balls are a mouth-watering commodity for public-industry conglomerates, especially those suffering the current malaise in golf-equipment sales. For some of these companies, it's not enough to satisfy the golfer; they must also satisfy shareholders, the droves of investors baying for growth, for extension of the company brand.

But re-inventing the golf ball is radically different from making golf clubs. The U.S. Golf Association's regulations on balls are strict and getting stricter. Costs are exorbitant-the Callaway Golf Ball Company estimates its start-up expenses at $ 150 million-and the industry is fraught with famous failures. "The market's already saturated," says Gene Parente of Golf Laboratories Inc., an independent testing firm in San Diego that sees many of the game's innovations well before the public. "My opinion is that companies are going to have a bloodbath on their hands."

This is the story of an already bloody war. It's a war of corporate espionage and pre-emptive strikes, executives and R&D wizards ricocheting between tantalizing new jobs, secret laboratories filled with Ph.D. polymer chemists and rocket scientists seeking to unlock the riddles of aerodynamics and dimple patterns. It's a war involving most of the barons of golf equipment, some content with capturing a specific niche of market share, others determined on dominating the original orb, the basic commodity of the game.

Behold, the wolves . . .

"Welcome to Fairhaven, a place as good as it sounds."

These are the words with which Walter R. "Wally" Uihlein (pronounced U- line), chairman and CEO of Titleist, welcomes you into his office in Fair-haven, Mass. To Uihlein, Fairhaven is indeed a town as good as it sounds, a small, smokestack-dotted, quintessential New England hamlet where Herman Melville set Moby Dick and where, Uihlein likes to joke, "We keep Captain Ahab's leg in a freezer." If the leg existed, Titleist would surely own it, so solidly is the company entrenched in the town and its thinking. After an hour or two inside the Titleist compound- touring its eight facilities, including three ball plants, totaling 800,000 square feet, with Wally and his minions; hearing Titleist sales leader Joe Curtis say, "Our reps eat, drink and sleep this job"; listening to the company "associates" and officers pledge absolute allegiance to the Titleist flag-you can almost imagine God decreeing Titleist the industry leader and Uihlein walking through the streets of Fairhaven with a tablet bearing the commandment, "Thou shalt have no other ball before thee."

Wally Uihlein personifies Titleist, whose employees are called "associates" and where company life is called a "culture." Celebrating 50 years as the global leader in golf balls, Titleist is the most played ball on the PGA Tour (see accompanying story). The company's products are backed up by a highly motivated sales organization, whose "Pyramid of Influence" hits its targets-tour pro, club pro and amateur- with un-flinching accuracy.

A graduate of the University of Mas-sachusetts, almost J.F.K.-esque in his monogrammed shirt, suit and tie, Uihlein takes his business very personally. Rocketing through 11 executive positions in two decades with the company, Uihlein refers to the Titleist customer as "you" and the Titleist brand as "me," as in, "If I lose you, then that's a wake- up call to come back to you and say, 'Hey, Mark, why did you leave me?'"

You immediately get the idea that competitors seeking to steal even the tiniest slice of Titleist's dominant 45-plus percent share of the U.S. market will have to first walk across Uihlein's dead body. Employing references ranging from motivational guru Tom Peters to the Amway direct-sales technique, Uihlein says the golf-ball business is ruled by the "Darwinian survival process."

"When you look at the competitive landscape-right now there are five companies that total 90-plus market share, among ourselves, Spalding, Wilson, Maxfli and Bridgestone [Precept]-it's not the strongest who is going to suffer," Uihlein says. "If the Darwinian survival process has any merit and validity to it, it's basically the weaker forces who will be first affected." Or as he says later, "The sheep will fall first, not the wolves."

Oh, but the interlopers are circling, hungry to steal even a sliver of market share, the term that will tally the score in the Ball Wars. One point of retail market share-representing the sale of 310,000 dozen of the 31 million dozen balls sold in the U.S. annually-can earn a com- pany an estimated $ 6.5 million a year. Titleist and its longtime, cross-state competitor, No. 2 Spalding, control an estimated 70 percent of the U.S. golf-ball market, with the other 30 percent divided primarily among Maxfli, Wilson, Bridgestone and Slazenger. Since the market has grown at a rate of only 2 to 5 percent a year-and industry analysts don't expect any radical increases-the pie is not expected to be expanded. So it's going to take a full-scale assault for any newcomer to snatch even a point of market share.

Uihlein says he's ready for any competitors. "Let's bring it on," he says. He speaks of competition in metaphors of war, employing terms like "hand-to-hand combat" to describe his sales force, and "rifle-shot focus" about the Titleist game plan for constant improvement. For Uihlein, Titleist is as indestructible as the balls it produces. The company was founded in 1932, when Acushnet Rubber Company's president, Phil Young, missed what he considered a well-stroked putt. Taking the ball for an X-ray at his dentist's office, Young discovered that the ball's core was indeed off-center. He

and a friend from the Massachusetts Institute of Technology spent the next three years creating the ball that would become the industry standard-the Titleist.

Forty-five years later-in 1977-Uihlein joined the company he had fallen in love with through a Titleist sales rep of almost mythical stature, Jim Kernohan. As a high school student working behind the counter of the Crystal Springs Country Club in his hometown of Haverhill, Mass., Uihlein caught Kernohan in a small statistical error and corrected him. "He looked around and said, 'Who said that?' " Uihlein remembers. "Because challenging Titleist was borderline heresy."

"You wouldn't wanna bet a dozen Titleist balls on that, would you?" Kernohan asked Uihlein, who accepted the bet and produced the proof in a magazine. When Kernohan asked him what he wanted to do for a living, Uihlein didn't hesitate: "I want your job," he said.

To prove Titleist's unwavering commitment to excellence, Uihlein and Herb Boehm, Titleist's executive vice president for golf-ball research and operations, lead me on a three-hour tour of Titleist's three ball plants, which run 24 hours a day, five days a week, producing 1.2 million balls a day. Dressing in long white lab coats and Titleist golf caps,

we enter the labyrinth, a loud, acrid, mechanical maze where, Uihlein stresses, almost everything is "patented and proprietary." It's a world of chemicals, robotics, X-ray machines, freezing tunnels, automatic ball winders, bouncing chambers, pneumatic suction-cup equipment, painting contraptions and a mind-boggling array of more.

What Uihlein and Boehm don't show is the company's R&D laboratories. As top-secret as the Pentagon, the labs house a 50-person staff-chemists, engineers, mathematicians and scientists-all working to keep Titleist years ahead of the curve. "We don't see it as a marketing game," Uihlein says. "Our best defense is the product. Which is why, in the last 24 to 30 months, we've had 20-plus patents issued. Which is why, this year, we've got four or five new golf balls, with additional intended new products in the next 12 to 24 months."

By the end of the day, you believe, you trust, you're ready to salute the Titleist flag. But, then, you remember. Oh, yes! There are challengers to the crown, always have been. No company is bulletproof- even Wally Uihlein admits it. "Some of us came of age when Uniroyal was one of the top-three ball companies, and obviously they're not in business today," he says.

Some time in 1995, the West Coast golf-club buccaneers began casting their covetous eyes toward Fairhaven. **Callaway** and Cobra had been begun as entrepreneurial businesses, but their revolutions in metal woods turned them into Wall Street commodities, hungry for new avenues for growth. At **Callaway**, Los Angeles consultant Fred Port was commissioned to do "some long-range planning," recalls company founder Ely **Callaway**. Port's extensive study of the golf-equipment business reaffirmed the company's vision for its next venture: balls.

"Because outside of golf clubs, it's the only area of golf that is a big business in golf equipment," **Callaway** says today. "We said, 'Since we don't know any-thing about the ball business'-at that time-'we gotta find the right man to head it up.' "

Today, **Callaway** says he doesn't expect to conquer the market with his first ball. "We're going to start out on a much more gradual basis and gradually move up and advance," he says. But in the beginning, he sought to launch his new ball business at the top of the food chain, where a Big Bertha-style revolution in golf balls-which he is convinced his company can eventually deliver-could be earlier harvested. So Ely Cal-laway first considered buying Titleist. "But they wouldn't sell it to us!" he booms. So he tried to buy the next-best thing: Wally Uihlein.

You would think the Eastern half of America would have to fall into the Atlantic for Uihlein to leave the town as good as it sounds. But one day in late 1995, Wally's phone rang and the voice of Ely **Callaway**, then 76, master of smoke, mirrors and mainstream marketing, poured through the line like a shot of Tennessee moonshine.

Meetings commenced. Deliberations ensued. "He went through a process of thinking he wanted to come with us," says **Callaway**. "They [Titleist] knew he was talking to us. They decided they wanted him even more than we did. So they kept him."

Unable to get Wally Uihlein, Ely Cal-laway went after the next-best thing: Chuck Yash, then president of Taylor Made. During the years Yash served as general manager of Spalding's ball division, he grabbed market share, most notably by pioneering the 15-ball package, infuriating Uihlein, who began calling him the "Darth Vader" of the ball business. If **Callaway** couldn't have Obi Wan Kenobi, he would hire Darth Vader.

The Ball Wars began publicly on May 13, 1996, when **Callaway** announced that Yash would join him in "launching, developing and heading up a new subsidiary, the **Callaway** Golf Ball Company."

Asked about the job offer from Callway, Uihlein initially says, "We have no comment on that." But later in the day, in the conference room with his chief officers, he says, "Everybody here has been approached [by **Callaway**]. It's like the scene in the Alamo where they draw the line in the sand, OK? And basically only one person ran off to tell Sam Houston that Santa Ana is coming."

At the same time of **Callaway's** an-nouncement, other West Coast insurgents were plotting their own arrivals. Taylor Made was dusting off nine patents from a ball project the company shelved in the early '90s, when inventing new and better golf clubs was the rage. In Eugene, Ore., Nike, which began planning its entry into the ball market in 1996, would contract with an established ball producer, believed to be Bridgestone-whose name, by signed agreement, Nike has sworn to keep secret-to create the recently launched Nike Golf Ball. Nike, some industry sources feel, could garner an immediate 2 to 4 points of market share on the strength of its Swoosh alone.

But for Titleist, the new competitors were all talk, no product- especially since one of them, **Callaway**, had no apparent ball patents registered in its name as of late 1998.

So while the West Coast threat is real, for the Titleist loyalists that's all it is: an idle threat. "In the absence of product, it's almost impossible to react," says Ed Abrain, executive vice president of sales and marketing. "So we don't 'What if?' We stay focused on what we need to do-continuously improve our own product."

"If he [**Callaway**] wants to have a war, you know, just name the time and place," says Uihlein. "But it's not going to change the way we do things."

"We're New Englanders," adds Abrain. "We don't plan on giving up our position easily."

And so they conduct business as usual, awaiting the phantom to show its hand. Titleist surely expected first fire from the West Coast golf-club revolutionaries. But it came instead from an unexpected source, the company's Massachusetts nemesis, the formidable No. 2 ball manufacturer, Spalding Sports Worldwide. But it wasn't the traditionally sleepy, predictable Spalding, but a newly enriched and emboldened company, recently acquired by the Wall Street investment giant, Kohlberg Kravis Roberts & Co., for whom the old rules are meant to be broken.

Enter the Raiders

Staring up at Kohlberg Kravis Roberts & Co.'s sleek glass headquarters- on the 41st and 42nd floors of the 9 West 57th Street skyscraper in the heart of Manhattan-you can sense the pulsing of testosterone, the stealthy power of pinstripes, the snapping suspenders of Buy and Sell. KKR headquarters is a galaxy away from the humble home of Spalding Sports, which is housed in a 1940s schoolroom-style brick building in the tiny town of Chicopee, Mass., where the dress code is as casual as the down-home attitude. But in the Ball Wars, Main Street is inextricably tied to Wall Street, and there is no clearer testament than Spalding, through which KKR has entered the Ball Wars with a bang.

The takeover titan profiled in the book and TV movie Barbarians at the Gate, KKR was the original corporate raider, snatching up private companies and selling off slices for a hefty profit. In 1996, a spiffed-up-for-the '90s KKR ponied up close to $ 1 billion to buy the Evenflo & Spalding Holdings Corp. from a Venezuelan company, fueling speculation that it would sell off the golf-ball division, possibly to the just-minted **Callaway** Golf Ball Company.

KKR did eventually separate Spalding from Evenflo, manufacturer of child-care products, in August 1998. Spalding, which produces balls under the Top-Flite logo and golf shoes under the Etonic brand, was a tantalizing ball KKR couldn't resist playing itself. Spalding executive vice president Scott Creelman insists that the takeover titan has let the company run its own business. But in KKR's two-year ownership, Spalding has switched presidents twice-quite a record for a company led for 23 years by president (now chairman of the board emeritus) George Dickerman.

For Spalding, 1998 had already been tumultuous: ball sales up only 2 percent in a market that grew by 4 percent; overall Spalding Sports Worldwide sales down by 3 percent, mostly due to declines in international sales. Then, on Dec. 1, Spalding's key officers left behind the shirtsleeve world of Chicopee to join the suits at KKR, where an announcement was made: Kevin Martin, Spalding's president for barely more than a year, had resigned. But Spalding wouldn't suffer, insisted the suits; the company would be beefed up with-what else?-more meat, more muscle! Ed Artzt, the former CEO of Proctor and Gamble, a director of American Express, GTE and Delta, and a Spalding board member since 1997, would become chairman of the board. Then, Spalding's new president and CEO, James Craigie, walked into the boardroom, resume humming: fresh from the presidency of the beverage and desserts division of Kraft (a division of

Phillip Morris), a U.S. Navy and Department of Energy veteran and Harvard M.B.A.-an increasingly obligatory sheepskin to lead a charge in the Ball Wars.

"I spent 15 years working for the Kraft side of Phillip Morris, where I rose up from the ranks in marketing doing a wide variety of their different brands," says Craigie. "I've developed many new products in my time. In my history, Jell-O fat-free puddings have come out . . . Country Time [lemonade]. I'm a mild golfer. I've got a lot more to learn. But I love the game. I think it's one of the most intriguing and difficult games in sports."

It was early December, four days after he had been tapped to run Spalding, and Craigie hadn't even begun his first day of work. But he was already sounding like a player in the style of his brash predecessor, Kevin Martin, the "Candy Man," who arrived in 1997 from the presidency of Brach & Brock confections, with a singular mission: to awaken the "sleepy, rather predictable" Spalding. "The golf ball is a fast-consumable item, like candy," Martin had said. "There are loyal customers who like the products they currently have. They are hard to switch. Then there are consumers who are willing to try new things, and they are always hunting for something that's going to give them an edge to their games."

Excitable, almost boyish, the Candy Man sold his advertising tactics for making consumers switch to Spalding. Golf-ball infomercials. Side- by-side compar-ative ads against his chief rivals. Million-dollar challenges. And yes, those infamous System C and System T balls designed to match the clubs of competitors Callaway and Taylor Made. Martin's barely one-year tenure in the ball business inspired a lawsuit and a challenge filed with the National Advertising Division of the Better Business Bureau-and general cursing from competitors coast to coast. His reaction? How sweet it is!

Spalding has a long history of pioneering golf-ball innovations: the two-piece, long-distance Top-Flite family; the first two-piece or nonwound ball used on tour (The Tour Edition, made famous by Greg Norman in the mid-1980s); and the oversize Magna. Spalding sells more balls worldwide than anyone else:

26 million dozen in 1998, seven million more than Titleist, and its plants run seven days a week, 24 hours a day, spitting out 1.7 million balls every day. But Spalding is not resting on its laurels; the company is intent on transforming itself from a rather gentle giant into a brash and scrappier player. That includes going head-to-head with Titleist and placing more emphasis on Spalding's premium golf balls. Spalding's Top-Flite XL balls have the largest market share worldwide, with 15 percent. But the company's most popular ball is also its lowest priced, selling at $ 16 for an 18-pack, while Titleist's upscale Professional sells for $ 54 a dozen.

Did it matter that Craigie and Martin knew next to nothing about golf balls before their arrival? Not at all. Because they are masters of something even more important: the science of sway. "In the ball business, like commodities, the market share and share of voice almost go hand and hand," says 25-year ball-industry veteran Hank Rojas of Bridgestone.

Spalding's voice is growing increasingly louder. "In an environment where Titleist's strategy is pretty well known-the No. 1 ball in golf- we have to convert players from what they're currently using to our product," says Spalding's Creelman. Or as Spalding urges in its marketing for the Strata ball: "Switch. And lower your scores."

The ball business was once generally a gentleman's game, with time- tempered regulations. In golf balls, it was rare for a company to mention the other guy's product in advertising. It was rare for companies to get in the face of their competitors in their marketing strategies; companies knew their place in the market and weren't so quick to cross the line. The new Spalding began crossing the line from Day One, first with "comparative advertising," a staple of aggressive political ads, hungry car-rental companies and desperate drug companies-not golf-ball manufacturers. But when Mark O'Meara began winning tournaments after switching from Titleist to Top-Flite's Strata, the company went comparative in ads mentioning O'Meara's switch from "a wound ball," a definite swipe at Titleist.

Spalding's first foray into side-by-side advertising featured a hard knock on Titleist's FootJoy golf shoe. There the shoes stood on the page: on one side, Spalding's Etonic, as new and shiny as a freshly minted Lifesaver; on the other side, Titleist's FootJoy, as brown as a Tootsie Roll. "We'd expect as much from Dexter," read the ad's copy.

"But FootJoy?"

Etonic's market share rose two points in 1998. But the powers in Fairhaven were not amused. "They threatened a lawsuit," says Kevin Martin. Indeed, Titleist isn't sitting idly. In 1996, its parent company, Fortune Brands, purchased Cobra Golf, the Carlsbad club manufacturer, which recently released-what else?-the Cobra Dista Golf Ball. The ball is

aimed-where else?-right down the throat of Spalding's distance balls. "Spalding is our best opportunity," says Fred Z Havens, Cobra's golf-ball product manager.

Having proven its appetite for confrontation to Titleist, the KKR-owned Spalding moved next to the California club manufacturers-**Callaway** and Taylor Made-whose principals had loudly announced their intentions to enter the golf-ball market. Mike Sullivan, Spalding's vice president of R&D, had spent several years working on what he considered a revolutionary idea: Top-Flite balls designed to maximize performance with two of the game's most popular drivers: the **Callaway** Great Big Bertha and the Taylor Made Ti Bubble 2.

The System C (to maximize play with the **Callaway**) and the System T (for the Taylor Made) were the perfect vehicles for introducing Spalding's newfound aggressiveness. The System boxes-picturing either a Great Big Bertha or a Ti Bubble 2 beautifully striking a Top-Flite ball, along with a chart to help golfers match up the ball to the appropriate competitors' clubs.

The company announced plans for the System C&T balls at the beginning of the 1998 PGA show in Orlando in a hotel ballroom packed with more than 2,000 people. One of the attendees, Ely **Callaway**, was not celebrating. "Putting our name and a picture of our product on their package?" **Callaway** remembers.

"I just thought it was kinda silly."

"Kinda silly" apparently rates high on **Callaway's** Richter scale of aggravation. His lieutenants used harsher language. "A sneak attack," raged one. **Callaway** sued Spalding for copyright infringement, but an early request for a court order to stop Spalding from using its images on its boxes was denied. **Callaway** is now into more than a year of grueling depositions of Spalding's officers. Taylor Made condemned Spalding's new product and filed a challenge with the National Advertising Division of the BBB. (The NAD ruled against Spalding; Spalding is appealing the decision.) Spalding also filed a counterclaim alleging an antitrust violation based on "**Callaway's** attempt to restrict Spalding from getting a head start on the club-specific golf- ball market."

Despite industry doubts, Spalding's Creelman insists that the System balls are on target, claiming approximately 1 point of market share and, just as important, "pre-empting" their new competitors in releasing club-specific golf balls. The question for Spalding, however, is whether the company bet on the wrong clubs. "**Callaway** and Taylor Made both seem to be losing visibility, especially in drivers," Creelman says. "There seems to be a shift toward Adams and Orlimar."

Sedition, rebellion and revolt

Now, let's move from the East Coast to the West, from the 1940s institutional buildings in towns as good as they sound to the sleek, new glass bunkers of Carlsbad, the erstwhile golf boomtown where anything goes.

"How are you going to position yourself?" Chuck Yash, president and CEO of **Callaway** Golf Ball Company, is asked of his new golf ball.

"Well, I'd rather not give our competition too many clues," he says.

"How many balls will you launch?"

"We have a pretty good idea but, again, we're not gonna basically be able to tell you that today," he says.

"So you can't tell me anything specific?"

"No, we can't," he says.

Sitting in his office, Yash plays his cards extremely close to his chest, as if the old man a few sunny bunkers down the road-Ely **Callaway**-is monitoring every word. Yash issues as many "no comments" as an embattled politician, while steadfastly maintaining that not only will **Callaway** have a ball, but it could very well be The Ball, a ball that will, in time, revolutionize the field as radically as the Big Bertha forever changed the landscape of clubs.

At the very moment of our interview, in Ely **Callaway's** office just down the street, the House of Big Bertha is reeling. To combat the recent downturn in what Ely **Callaway** calls the "declining worldwide" market, **Callaway** is laying off 700 employees and jettisoning peripheral businesses-interactive golf sites, golf-book publishing, driving ranges-to concentrate on, as Ely Cal-laway drawled on CNBC, CNN and Fox News, "our core businesses . . . golf clubs and golf balls."

In this distressed market, **Callaway** is betting $ 150 million and his company's future not only on golf balls, but on the man he selected to lead his invasion into the competitive ball market: the da Vinci of golf-ball discounting, the inventor of the 15-ball pack, Chuck Yash. The former Navy lieutenant with the Harvard M.B.A. wears a golf shirt and slacks. But beneath the at-ease exterior beats the heart of a warrior, hungry for the taste of sea air and gun powder. "Oh, it's a huge degree of importance," Yash says of **Callaway's** success in the ball market.

If you have any doubt, a visit to the construction site of the company's (since-completed) 200,000-square-foot ball plant, with its sign, Future Home Of The **Callaway** Golf Ball Company, is all the proof you need of **Callaway's** commitment.

Yash's life has been a blur since the summer of 1996, when he jumped ship from the presidency of Taylor Made to accept **Callaway's** offer to create "a ball that's demonstrably superior and pleasingly different to leading competitive golf balls," a directive now posted in the office of every **Callaway** Golf Ball Company employee.

Talking about the ball, Yash tends to speak in "Ely Sezes," as in, "Ely says he's never seen this happen in American business."

They are talking about something called "Parallel Pathing," the insanely intense and expensive process of building a golf-ball company from scratch. It's never been done with golf balls before, for good reason. Parallel Pathing re-quires juggling everything-assembling the multifaceted team to invent the ball, designing and building the ball plant, developing the ads and marketing, educating the sales forces, and manufacturing, testing and developing the product-at the same time. Yash has his parallel path mapped out on his wall, a multicolored chart of forward-marching straight lines, one line for each of a dozen different functions, each line stacked on top of the other in different colors, all lines leading to the planned launch in either late 1999 or early 2000.

"Ely's just fascinated with how we start from a green field with me, as one person," Yash says. "I mean, I can't image an East Coast, established company would've given me this type of opportunity and this type of asset base and resources to say, 'OK, Chuck, build your team. Let's go do it and take no prisoners.' "

The East. You'd think it was the Evil Empire. But it's the place from whence Chuck Yash came. He served 13 years at Spalding, four years as general manager of the golf division, responsible for balls, the "Darth Vader," as Uihlein called him, a mantle Yash now wears proudly. "Wally felt we were kinda disrespectful to the traditions of golf in coming out with things like 15-ball packs and doing things in a way that didn't meet his expectations or the past expectations of the trade," says Yash. "So I think he really wanted to paint himself as the white hat and us as the black hat."

Uihlein was right: For Yash, traditions are meant to be broken. Think back, Yash suggests. It wasn't that long ago-"10, 20 years"-when the golf-club market was dominated by the likes of Spalding, Titleist, Wilson, MacGregor, all of them east of the Mississippi. Now, look around Carlsbad, look at the gleaming new headquarters of **Callaway**, Taylor Made and Cobra. "The West represents probably 90 percent of all drivers and fairway woods sold," he says. "It's interesting how the innovation, the forward-thinking, comes from out West. The West meaning Cobra, **Callaway** and Taylor Made. And almost the same percentage of irons, when you look at Ping, Cobra, **Callaway** and Taylor Made. The Eastern establishment looks at the ball business as established procedure and process . . . and has the expectation that they are deserving of market share, because they're there. Not because they look to innovate and make new and better products."

So when the Eastern establishment companies snicker, "Where are Calla- way's patents?" and "No revolution in balls has ever come from anyone outside of the ball business," Yash has a quick and easy answer: "The head of the patent office in 1899 said we oughta close the patent office because everything that was ever invented has been invented," he says. "That's the kind of closed thinking that gets these companies in trouble."

Or, as Ely says about comments from competitors that he'll never revolutionize balls the way he did clubs: "When we went into the golf- club business, they said exactly those same words. They didn't think we could survive, let alone create a revolutionary product."

Sedition, insurrection, rebellion and revolt . . . Yash and the other West-Coast ball producers see themselves as noble iconoclasts, heirs to the spirit that drove immigrants across oceans, pioneers across prairies, inventors across untrammeled realms of the brain, all departing the safe terrain of What-Is for the territory of What-Can-Be. They talk about the advantages of beginning with a "blank slate" and a "green field," without the baggage of a predecessor's ideology or preconceptions of the marketplace.

This is why **Callaway** and Yash eventually decided against buying Spalding or Maxfli, they contend. Not because of the companies' exorbitant price tags, but the baggage that went with it. "Ely and I felt, 'What do we get for that?' " Yash asks. "You get market share. You get old equipment. You get a culture that's definitely not **Callaway**-oriented. You get a lot of the previous management's operational theories, which may or may not be the most forward-looking. . . . Could we have gone to someone like Nike did, go to Bridgestone and just make the Bridgestone balls and put a Nike logo on 'em? We could've done it that way. But would we have been successful long term? I kind of doubt it, because we would have been hostage to Bridgestone's technology. You think Bridgestone's gonna give Nike their latest and greatest technology? Heck, no."

In the spirit of beginning with a green field and blank slate, Yash hired **David Felker** from Du Pont to head the R&D department. "We didn't take the head of Spalding or the head of Titleist or the head of Wilson or the head of Maxfli," Yash says. "If we'd hired one of those guys, what would we have gotten? We would've gotten a guy who knows their own company's culture."

But the totally **Callaway** ball will only be a ticket to enter another battle in the Ball Wars: the marketing.

The white canvas

For the marketing and advertising armies, the golf ball represents the ultimate opportunity: a plain, white canvas on which to project their ball's unique and compelling "story." No, it's not enough to create a great ball. In the Ball Wars, in which all of the products are round and white, word of mouth won't be enough to get your ball noticed-not with giants like Nike committed to "becoming one of the top-four ball advertisers in the world," according to Merle Marting, director of golf marketing.

To separate their ball from the pack, ball makers will have to rely heavily on marketing, because of three main reasons:

(1) Technological advances are being "stifled" by the USGA. "There's not a lot of patents left in the landscape for truly meaningful new ideas to emerge," says David Longfritz, Maxfli's director of golf-ball marketing.

(2) Nobody needs new golf balls. "With clubs, you can convince someone to buy this year's new model-because of whatever new technology-over last year's model. A new club can actually grow the club business. Golf balls are completely different," says Jeff Christensen, Wilson's golf- ball marketing manager. "Golf-ball usage is directly correlated to rounds played. The only way for people to use more golf balls is to actually go out and play more-and there's no manufacturer who can affect that."

(3) Retailers are skeptical. "It's no secret that everybody and their brother is getting into golf balls," says Steve Pelisek, vice president of sales for Cobra golf balls. "And it's no secret that golf-ball retailers think they already have too many balls to sell."

So prepare yourself for the "stories" of the amazing new balls of the Ball Wars, in which every ball must not merely show, but tell.

"Before a consumer hits the golf ball, you've got to plant the seed in his head about what the ball's going to do," says Mike Sullivan, Spalding's vice president of research and development.

The marketeers stand ready for the war of words. "A lot of marketers look at this as a dark Armageddon, but I don't," says David Brannon, president of Slazenger Golf, U.S.A. "I think there will be an explosion of interest in a product category that has often been taken for granted. A golf club is an extension of the body. You have an intimate relationship with your wood, iron, wedge or putter. A golf ball is inert, lying in the grass, waiting to be abused. The new entries will enliven interest in the process."

The glory of 'story'

To understand the importance of creating a compelling story, myth and promise around a new golf ball, let's travel down the street from **Callaway** to the new, palm-festooned headquarters of Taylor Made, where company president and CEO George Montgomery, a sunny, optimistic guy with a glint in his eye, tells you the story of the Taylor Made golf ball, which will be released this year. Last July, the company announced the acquisition of Hansberger Precision Golf, including the company's 122,000-square-foot ball plant in Pontotoc, Miss., and Taylor Made's intention to "launch a bold drive into the $ 1.1 billion golf- ball industry" by investing three times the company's purchase price in new ma-

chinery. But that was only preamble. The real story-the story you're going to hear when the TM ball is finally launched-has far more magic than mere plant acquisition.

In a Taylor Made conference room, Montgomery has his ball's "story" in his hands-a "coupon" of rubbery material he removes from a "top secret" binder. He won't divulge the name of the material, which is shaped like a tiny paddle of plastic and will be an integral ingre-dient in the company's new ball. He flicks it and let's you flick it. "Watch it snap back and flip," he says. "You'll get a feel for how resilient it is." This is the magical material, the "Flubber," on which Taylor Made is betting its aspirations, not for dominance, but a "respectable success," a slice of market share represent-ing $ 100 million in sales.

Here's the "story." A component of this magical compound languished for years on the shelf of Taylor Made's par-ent company, Salomon Sports (now owned by Adidas), says Montgomery.

It had been used in Salomon ski equipment, then was discovered as a revo-lutionary material for golf balls (and quickly patented), but then shelved with Taylor Made's nascent ball project in the club-crazy early '90s. During this time, competitors sought to purchase or license the patent, which demon-strated to Taylor Made the important of this breakthrough. After the success of the Bubble shaft, Taylor Made decided to manufacture a ball to use the material.

"Titleist would give their right arm to get this," says Taylor Made's Ball Development Manager, Dean Snell. (Wally Uihlein has no comment about either the Taylor Made ball or Dean Snell, who apparently was the man who crossed Uihlein's "line in the sand" to tell "Sam Houston that Santa Ana is coming.") Snell was responsible for turning the miracle material into a viable ball. For seven years, Snell served as a Titleist senior R&D engineer. With the arrival of the Ball Wars, he says he became one of the five or six veterans in each of the Titleist departments of R&D, sales and manufacturing "being called every day" by the West Coast ball-company re-cruiters. When Titleist declined to match Taylor Made's offer, Snell left and began assembling a top-secret R&D laboratory hidden in a Carlsbad business park. There, he and his team worked 10 to 12 hours a day, creating hundreds of prototype balls, empowered, Snell says, by the idea of working with no limits, no traditional boundaries, able to go wherever their imagination took them. They emerged many months later with not only a competitive ball, but, Snell promises, a revolutionary ball worthy of the Taylor Made name.

When the ball is released, possibly at the PGA Merchandise Show in January at Orlando, it will land upon a crowded field of logos: of familiar scripts, emblems and finally, Swooshes, Nike Swooshes. The Oregon-based sport-ing-goods giant recently unveiled the new Nike golf ball in the company's showroom in downtown Manhattan. And while Nike founder Phil Knight, the scruffy faced sneaker maverick who barged into the golf market by mega-signing no less than Tiger Woods, wasn't in attendance, his specter loomed over the showroom. The result of two years of re-search and development, the new Nike golf ball has a story of its own: "Nike responded to research that indicated for every 10 consumers who enter a retail store, only one knows exactly which brand and ball he/she wants to purchase," says Marting, whose statement is contested by most of the established ball companies. To convince the golfer to switch to the famous Swoosh, Nike created a "presentation" of four performance-driven balls, all designed to give the golfer greater accuracy ("A golf ball that has great distance is little help if it lands out-of-bounds," says Nike Golf product marketing manager Brian Zappitello) and to stand out from the pack. ("Our research showed consumers were confused as to which ball would be best for their game.")

Nike's ball story is compelling, of course, but only the first of many to come in a war as much about words as product. In the final analysis, the golf ball is like the game of golf itself. "It's a target game, but it's also about hope," Wally Uihlein had told me. "We've come to look at technology as a vehicle that's going to allow us to master the game that can't be mastered."

He had been asked a simple question about his West Coast competitors: "Can they revolutionize golf balls like they did golf clubs?"

"They may," Uihlein answered. And for a split second you could sense the tiniest flicker of doubt, the opening the West Coast interlopers are counting on: every golfer's dream of the invention of something, anything, that might help them conquer the unconquerable game. But then the flicker immediately disappeared and Uihlein began talking about his product again.

**IAC-CREATE-DATE:** April 14, 1999

**LOAD-DATE:** April 19, 1999

# EXHIBIT E

## FULLY REDACTED

# EXHIBIT F

## FULLY REDACTED

# EXHIBIT G

## FULLY REDACTED

# EXHIBIT H

## FULLY REDACTED

# EXHIBIT I

## FULLY REDACTED

**CERTIFICATE OF SERVICE**

I certify that on May 22, 2007 I electronically filed the foregoing with the Clerk of the Court using CM/ECF, which will send notification of such filing(s) to Richard L. Horwitz and David E. Moore.

I further certify that I caused copies to be served upon the following on May 22, 2007 in the manner indicated:

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